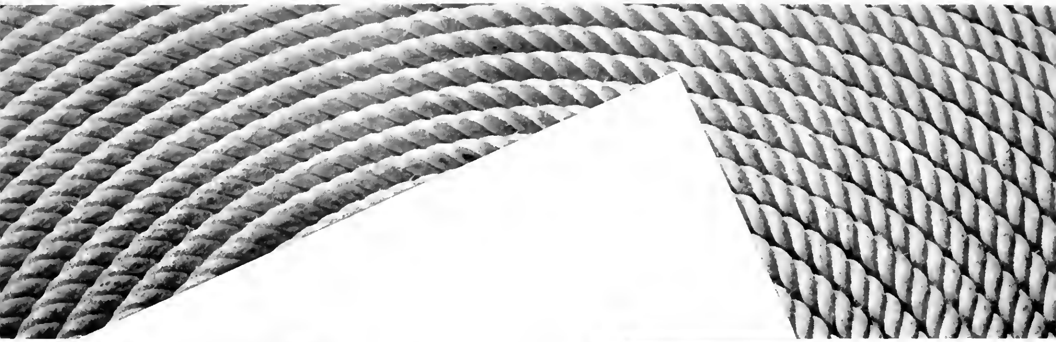
Pacific MARINE REVIEW

JANUARY 1948



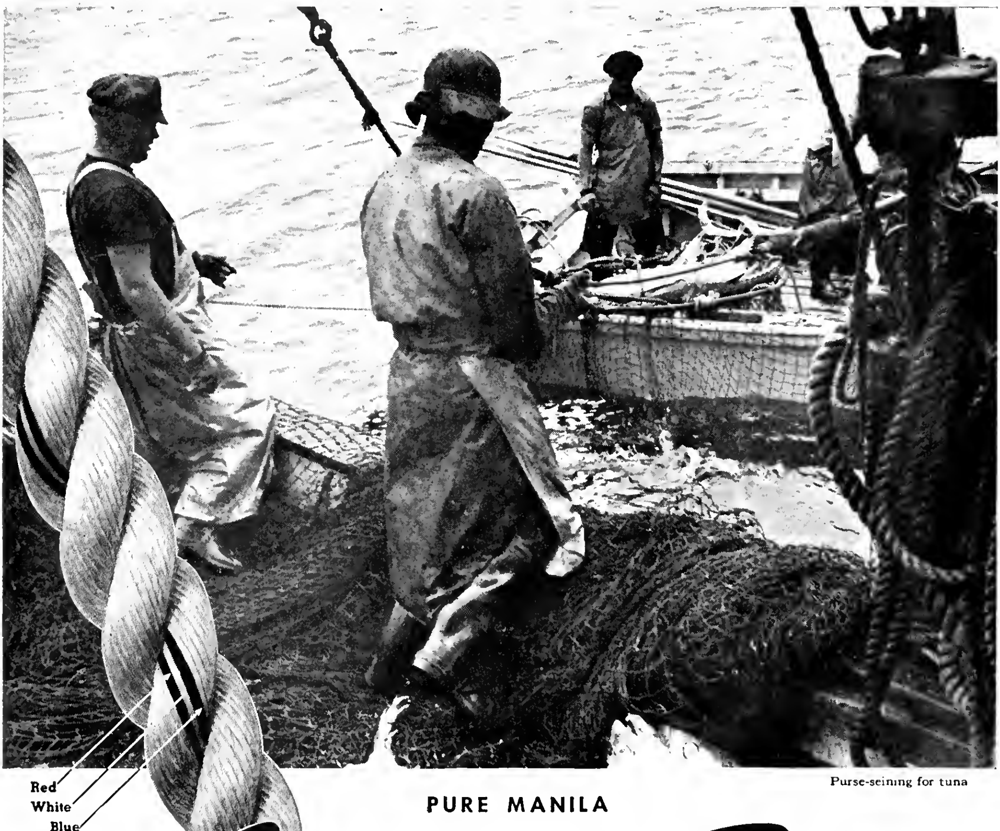
Pacific MARINE REVIEW

Subscription rates:

One year, $2.00; two years, 3.50; three years, $5.00; foreign, $1.00 additional per year; single copies, 25c.

TABLE OF CONTENTS - - - - - - - - - JANUARY, 1948

PUBLISHED AT 500 SANSOME STREET • SAN FRANCISCO 11, CALIFORNIA
LOS ANGELES OFFICE . . . . . . 816 West 5th Street, Zone 13. Telephone MIchigan 3129



Purse-seining for tuna

Pacific MARINE REVIEW

THE GATEWAY TO THE ORIENT

AS WITH STATISTICS, it often happens that some one item is taken from a speech or report and glamorized to the point of ridiculousness. So it is with a spot presumption of his own by a prominent ship operating official, which, he went on to say was no longer true. It had to do with the Pacific Coast's position as the gateway to the Orient.

Almost any set of figures can be misleading. For instance statistics would lead us to believe that the principal exporting of citrus fruits is not from Southern California, nor Texas, nor Florida. It is from Detroit. Some statistical tables credit the last port of call with the entire cargo of a ship. Some call bunker fuel an export item—even when taken by a Navy vessel. In some ports only cargo that moves across a pier is included in export figures; if loaded from a barge it is credited to the barge's home port. The boys who break down statistical figures to prove some point of criticism should give a thought to Longfellow's "all your danger is in discord."

The Gateway to the Orient is the Pacific Coast and its ports. As with a farm or a home, there may be *back* gateways, but the gates that are tagged with address labels are out in front. There can be more discord—more real damage to the Pacific Coast—created in world markets by attempts to remove the "Gateways" label from its ports than can be overcome by years of good public relations and the establishment of foreign trade zones.

Comparing one month with another, or one year with another, is not fair. Conditions may be abnormal, or subnormal, at one time or another and the statistics boys who do not understand will be lead astray. And deliberately excluding Army and Navy cargo and also tanker cargo, both of which are major Pacific Coast groupings, in order to prove a point, give those who live by statistics a field day. Pacific areas now served by Army and Navy are not temporary. They will continue to be served by some one. Japan and China are low for the time being but will come back as a strong factor in Pacific Coast cargo movement. When they do, and when surplus war goods in the Pacific are absorbed, and when export restrictions are equalized with shippers who are nearer to Washington, and when Pacific Coast operators have their fleets restored, and when intercoastal services bring more export and import traffic to Pacific Coast ports, comparisons with prewar will be less odious.

It is all very well to fight influences that would attract traffic to less logical shores, but let us not mislead our people. The Pacific Coast has problems that are common to all fighting frontiers. We are after the best and the most and have never been known to accept mediocrity as an ideal.

PRESIDENT CLEVELAND

Heading out through the Golden Gate on her Trial Run.

President Cleveland—America's Most Modern Liner

BETHLEHEM-ALAMEDA SHIPYARDS, INC., have good reason to feel proud of their latest product (P2-SE2-R3) the SS *President Cleveland*. In construction, machinery, outfitting, furnishings, and interior decoration, she is a first-class vessel, built to the highest standards, and capable of maintaining the most exacting schedules in the long run to the Orient.

And Bethlehem-Alameda *is* proud. Say to any employee of the Alameda yard, from the office boy to the general manager, "This is a good ship," and the answer snaps back, "That's the only kind of ship that Bethlehem knows how to build!"

President Cleveland is the largest passenger vessel ever built in a Pacific Coast yard, and the largest built in any American yard since the *America* in 1939. Her principal characteristics are shown in the box herewith. She was built to the very high standards set by law and regulation for American passenger vessels and conforms with all the applicable rules of the following shipping and shipbuilding regulatory bodies:

1. American Bureau of Shipping.
2. U. S. Coast Guard: Division of Inspection and Navigation.
3. International Load Line Convention.
4. U. S. Public Health Service for Inspection and Certification of Vessel Sanitation.
5. International Convention for Safety of Life at Sea.
6. Senate Report No. 184.
7. U. S. Customs Admeasurement.
8. Panama Canal Regulations.
9. Suez Canal Certificate.

The Trials

To the several hundred persons converging toward this vessel in the early hours of December 10 at the outfitting dock of the yard, she presented a beautiful floodlighted profile against the dark pre-dawn sky. On her official trials that day she behaved like a well-trained thoroughbred and met all the specified results with a good margin to spare. These tests included: a gradual work-up from 80 RPM of the propellers to 110 RPM in 10 RPM increases at half-hour intervals; crash back from 110 RPM ahead to 90 RPM astern; crash ahead from 90 RPM astern to 110 RPM ahead; four-hour economy run at 120 RPM 18000 SHP; and one hour maximum power run at 124 RPM corresponding to 20,000 SHP. The results of these tests are recorded in Table I.

The fuel economy figures in Table I need a little explanation. Under identical conditions of operation, the fuel economy for normal power would be slightly better than that for maximum power. On these trials when conducting the four-hour economy test, a number of auxiliaries such as the two big low pressure evaporators are required to be in operation, thus considerably increasing the auxiliary use of steam. On the maximum power run,

Left, W. Miller Laughton, Pacific Coast General Manager, Bethlehem Steel Company's Shipbuilding Division; right, Thomas C. Ingersoll, Manager, Bethlehem's Bay Area Yards.

Rail birds watching the Golden Gate disappear on the sunrise on the Cleveland's trial run.

only those auxiliaries necessary to normal ship operation are required and the auxiliary steam consumption is much lower. In this ship an additional very slight advantage is gained for the maximum power test in that the steam has a slightly higher heat content as it reaches the turbine than it has at the normal output from the boilers.

Some Trial Results

Diameter of turning circle—700 yards approx.
Head reach—2940′ ahead
Stern reach—1000′ astern
Time till dead in water ahead 3 min. 30 sec.
Time till dead in water astern 2 min. 10 sec.
From full ahead at 128 RPM to 90 RPM astern 5 min. 19 sec.
From full astern at 90 RPM to full ahead at 126 RPM 14 min. 26 sec.
From full ahead at 128 RPM to 0 RPM 1 min. 17 sec.
From 90 RPM astern to 0 RPM 20½ sec.
Estimated speed on economy run—22 knots
Maximum power developed—20460 SHP
RPM aver. both shafts—122.9
Corresponding fuel SHP hour, all purposes, aver. both engine rooms .609 lbs.
Normal power economy run SHP—18,230
RPM aver. both shafts 119.5
Fuel SHP hour, all purposes, aver. both engine rooms—0.623 lbs.

TABLE I

When she steamed out through the Golden Gate, December 27, on her maiden voyage, she was equipped and stocked in most complete fashion to take care of the 550 passengers aboard for the round trip scheduled to arrive back at San Francisco 8:00 a.m., February 9, and timed as follows:

ARRIVE		
Honolulu	6 a.m.	Jan. 1
Manila	6 a.m.	Jan. 13
Hongkong	6 a.m.	Jan. 18
Shanghai	Tide	Jan. 22
Yokohama	Tide	Jan. 27
Honolulu	8 a.m.	Feb. 4
San Francisco	8 a.m.	Feb. 9
DEPART		
San Francisco	Noon	Dec. 27
Honolulu	Midnt	Jan. 1
Manila	6 p.m.	Jan. 16
Hongkong	Tide	Jan. 20
Shanghai	Tide	Jan. 24
Yokohama	5 p.m.	Jan. 27
Honolulu	8 p.m.	Feb. 4

Master of the *Cleveland* on this trip is that "grand old sea dog" Commodore Henry Nelson, formerly skipper of the *President Coolidge* and one of the most colorful and best-loved veterans of Pacific Ocean navigation. Other officers include: Fred Jennings, chief engineer; Edward A. Seeley, chief purser; Samuel A. Agnew, chief steward; Herman L. Schurtz, chef, former chef on SS *Leviathan.*

American President Lines visualizes a fleet of four identical liners in their oriental service. SS *President Wilson,* sister to the SS *President Cleveland* and now nearing completion at Bethlehem-Alameda Shipyard, will be ready sometime this spring. When she is on the run, SS *General M. C. Meigs* and SS *General W. H. Gordon* will be taken out of service and converted to

Principal Characteristics of President Cleveland

Length Overall	608′ 5¾″
" 32 Ft. Waterline	593′ 2 ″
" 29 Ft. Waterline	590′ 0 ″
" Bet. Perpendiculars	573′ 0 ″
Beam molded	75′ 6 ″
Draft subdivision	30′ 0 ″
Draft scantling	32′ 0 ″
Normal Shaft Horsepower	18,000
Sustained Sea Speed	19 knots
Depth Molded Promenade Deck	61′ 6 ″
Height Upper Deck to Promenade Deck	9′ 0 ″
" A Deck to Upper Deck	9′ 0 ″ at side
" B Deck to A Deck	9′ 0 ″
" C Deck to B Deck	8′ 6 ″
Crew including spares	352
Passengers (about)	550
Lightweight of ship including 700 tons fixed ballast	12,424 tons
Deadweight in long tons—	
Stores, passenger, crew and effects, and pools	545
Fresh water	388
Fuel oil	4,343
Cargo oil	762
Cargo oil heating water	114
Refrigerated cargo	500 @ 70 cf/ton
General cargo	4,431
Total deadweight	11,083 tons
Total displacement at 30′-1⅞″ draft	23,507 tons

luxury class passenger liners similar to the *Cleveland.*

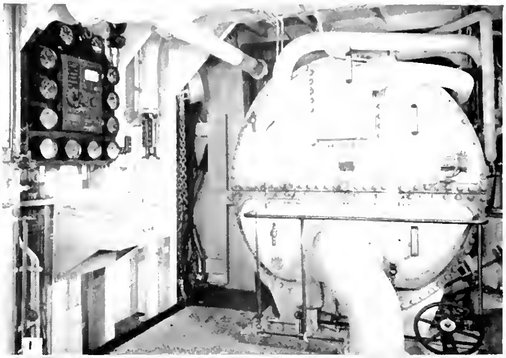
American President Lines is also at present planning to build five new specially designed vessels for their Round-the-World service—the V-2000. They hope to have these vessels in operation some time in 1949. In the words of President Killion of APL, "With revised and faster schedules, luxury passenger accommodations, and most modern cargo-handling facilities, this fleet now in the process of organization, will raise new and higher standards in transpacific and round-the-world transportation services."

A passenger liner is a first-class hotel afloat and self-contained. All her services must be maintained with a very high degree of reliability through her own machinery. In addition she must be able to move herself on definite schedules from one port to another, almost regardless of weather. She is therefore one of the most complicated structures devised by the mind of man and her functioning is dependent on a great number and great variety of mechanisms. These together with the furnishings and equipment give work to a great many artisans who are scattered all over the nation and who in many cases may never have seen a shipyard or even have seen salt water. The cost of a vessel is distributed over the whole country for labor and materials, to a greater degree than is true in any other industry. A par-

Top picture, left to right: Arthur Poole, Vice President and Treasurer of APL, James L. Bates, Director of Technical Division, Maritime Commission; George G. Sharp, Naval Architect; W. Miller Laughton, General Manager of Pacific Coast Bethlehem Yards, E. Russell Lutz, Exec. Vice President of APL; Henry Frick, Consultant.

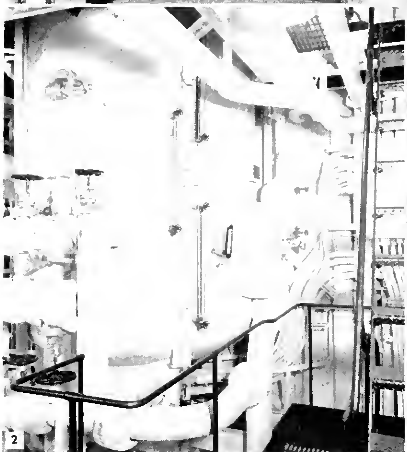
Bottom picture left to right: Tom Ingersoll, Manager of Bethlehem's Bay Area Yards; Tom Cokely, Vice President and Operating Manager of APL, Fred Doelker of W. R. Grace & Co., Captain Perch, Assistant Operating Manager of APL; William Warren, Principal Surveyor of American Bureau; Alexander J. Dickie, Consulting Editor, Pacific Marine Review.

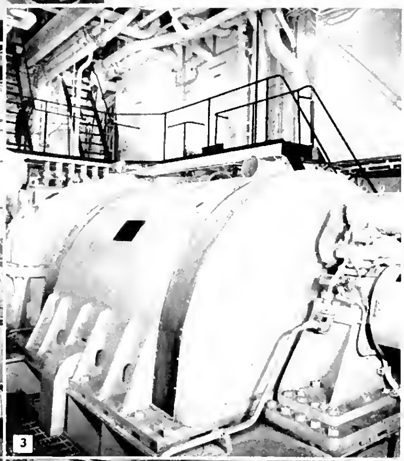
Wake of the Cleveland during steering tests

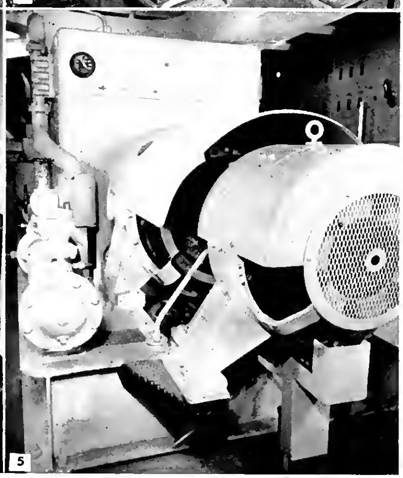


PROPULSION

1. The Distiller Flat. Two Bethlehem low pressure type distillers (one in each engine room) have a combined capacity to produce 80,000 gallons a day of good fresh water. 2 The Cochrane deaerating feedwater heater raises the condensate 240 F. and removes all entrained gases. 3. One of two General Electric main turbine generating sets, each of which supplies a normal 9000 shp to one of the propulsion motors. 4. This Worthington centrifugal main circulating pump drives the cooling water through the condenser tubes. 5. Four General Electric steam-turbo auxiliary generating sets provide electric power for light, cooking and auxiliary machinery.

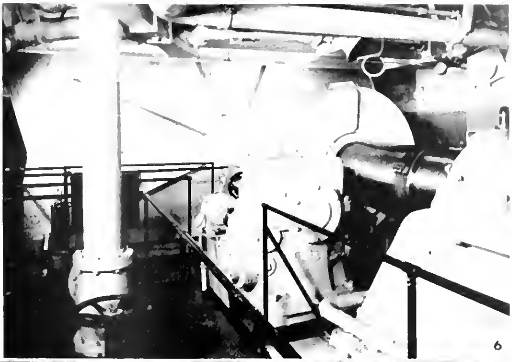


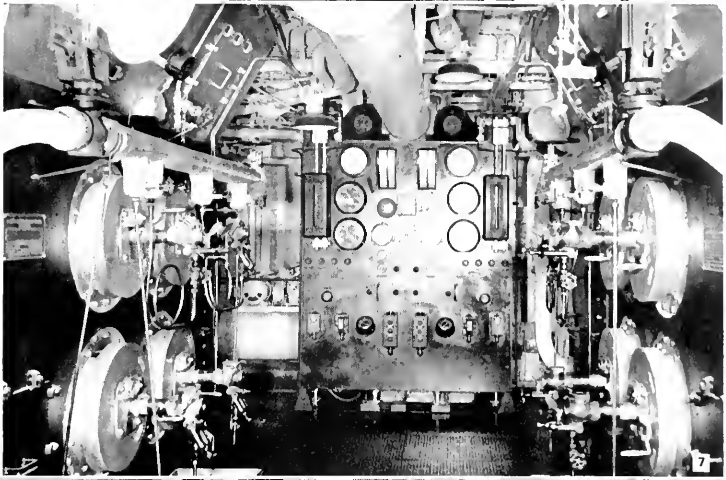




MACHINERY

6 One of the two General Electric 9000 shp propulsion motors. View looking forward from thrust block. 7. Firing alley in one of the two engine rooms featuring the boiler fronts of the Combustion Engineering boilers with their Todd burners and the Hagan automatic control board. 8 Then engineers desk, engine telegrapn and main turbo generator control board in one of the two engine rooms. 9. Part of a General Electric main switchboard dead front type.


6


7

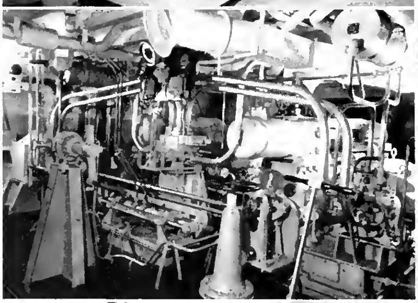
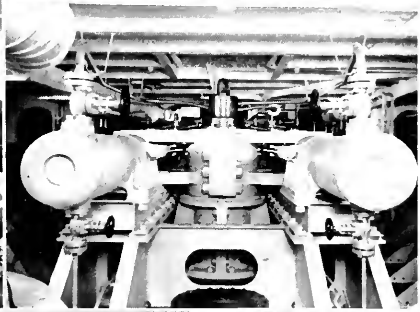
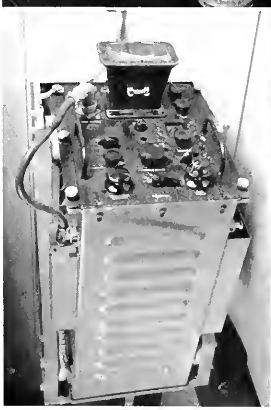
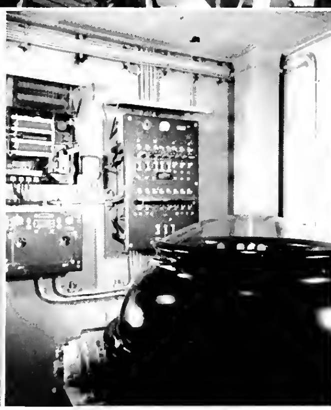

8


9

Navigating Equipment and Steering Gear

Top: Radar mast. Second row: Left—Chart room [illegible] radar [illegible] at extreme left. Right: Wheel house [illegible]. Third row: Left—Steering gear, forward end. Right: steering gear, after end. Bottom row: Left—[illegible]; center—Gyro [illegible]; right—G. E. Electronic Navigator [illegible].



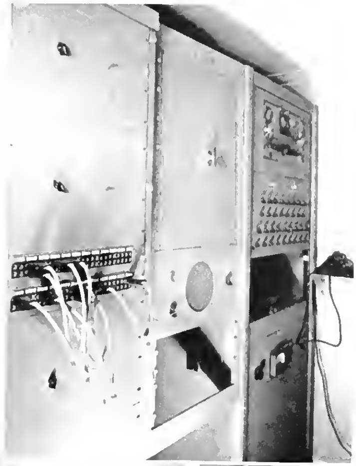






tial list of vendors supplying the *President Cleveland* indicates that it comes from 15 states, 5 of which are middle western states.

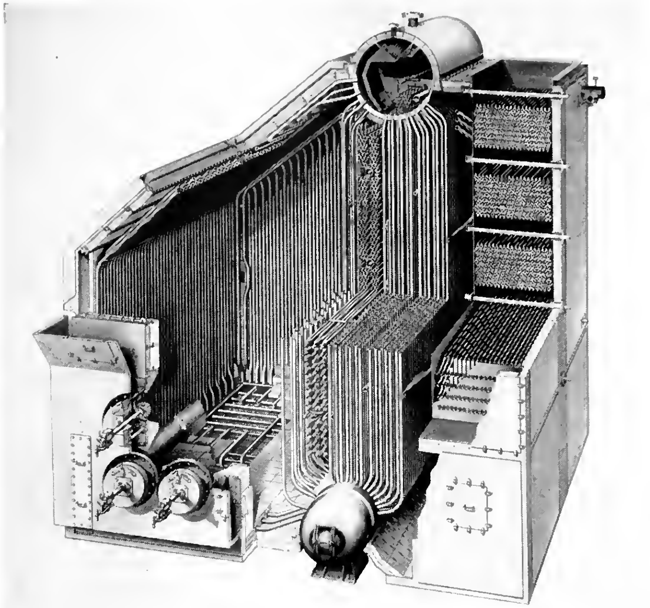
Hull Design and Construction

The basic hull design of these vessels was evolved by the U. S. Maritime Commission, Technical Division, and altered by the Navy. All passenger accommodation and crew space arrangement and interior decoration design was produced by George G. Sharp, Naval Architect, New York. All joiner work, furnishing and interior decoration were installed and erected by the Aetna Marine Corporation.

The hull is of combined riveted and welded steel construction with a curved stem, a cruiser stern, and with three complete decks and a partial deck. These decks are designated A, B, C, and D. Above these are: an upper deck extending from the stem almost to the stern; a promenade deck extending from the stem to frame 168, a boat deck covering the midship house; and a navigating bridge deck. The midship house above the boat deck is of



Top: Music and broadcast room. Center row Left—Watertight doorway with watertight door half-closed; right—Automatic telephone exchange and steward's call board. Bottom row Left—Fire control room showing CO. panel and watertight doors panel; right—Radio room.



Cutaway view of one of the four Combination Engineering boilers, showing the interior arrangement of boiler tubes, superheater tubes, and economizer tubes.

riveted aluminum construction which saves some 75 tons in weight at a position where weight saving is important. This use of aluminum is new in merchant ship construction although the Navy has used this metal on the superstructures of destroyers and cruisers with very satisfactory service results. In this work all rivet holes are drilled or punched to a diameter 1/16th inch less than that of the rivet. After assembly and packing, with every third hole bolted, the holes are reamed to a diameter 1/32d inch larger than the rivet. Up to and including 3/8″ diameter the rivets are driven and set up cold. Above 3/8″ diameter they are driven hot.

All decks above A deck have both camber and sheer, A deck has sheer but no camber, decks below A have no camber and no sheer. As has been usual for some years in American passenger liners of this type, the promenade deck, in way of the house amidships, projects about 2 feet outboard from the hull, port and starboard. This serves the purpose of helping to keep boats clear of hull when lowering and allows the installation of flood lights under this overhang to illuminate the sea. It gives, of course, a wider promenade which is a decided advantage for passenger recreation and loafing space.

Several of the weather decks in the way of passenger accommodations are covered with Oregon pine decking 2⅝″ thick and 4½″ wide. Margin strakes on these decks are of teak 2⅝″ thick and the pine timbers are carefully nibbed into the teak at curved sections of the ship and around all deck fittings. Deck timbers were laid over a coating of Dex-O-Tex, a corrosion-prevention composition manufactured by Crossfield Products Corp., of Los Angeles, and all seams caulked with two strands of cotton and one of oakum payed over with marine glue.

It is an interesting sidelight on the widespread benefits of shipbuilding that the grommets used to make a watertight seal under the nuts used to hold the wooden decks to aluminum or steel decks on these vessels are procured from California Blind Craft, Inc. Steel studs are welded to the steel decks and aluminum studs to the aluminum decks. Highest grade Oregon pine decking is drilled and counterbored to receive these studs, and the nut with washer and grommet is screwed down onto the stud in the counterbore. Nelson automatic welding guns were used to fasten studs to decks. All counter sinks were carefully stopped with an Oregon pine plug set in white lead and carefully chosen to harmonize with the grain in the adjacent timber. This work was all done by Builders Wood Flooring Company, Inc., of New York, who also furnished and installed all the wood railing on the vessel.

Provisions for air conditioning and ventilating are very complete. Air conditioning is provided: for all cabin and tourist class passenger staterooms; for a number of ship's officers staterooms and offices; for all mess rooms; for tourist and cabin class dining rooms; the library, waiting room, writing room, and shops; and for tourist, cabin, and officers' lounge rooms. Mechanical ventilation is provided for practically all the enclosed spaces on the ship. In general the air supply to all uncooled space is required to equal 30 cubic feet per

minute for each occupant. In unoccupied spaces the air change varies from a complete change every two minutes in the battery room to a change every 30 minutes in dry cargo spaces, air supply to be for the gross cubic measure without benefit of deductions for furniture or other contents and no space to receive less than 25 cfm. Air conditioning machinery is supplied by the Carrier Corporation and the ventilating and air conditioning systems

Top row: Left — Stateroom air conditioning unit; right—Wine room. Center row: Left—Ship's meat room; right—Cargo reefer room. Bottom row: Left—Ship's service reefer machinery room; center — George Hoefner, asst. operating engineer at Bethlehem-Alameda, and Hart Livingston, asst. machinery superintendent, also of Bethlehem-Alameda, at main control board for the Carrier Air conditioning equipment; right—ice cream and milk room.

are equipped with Ilg fans. Air conditioning systems are served by heaters and cooling coils supplied by McQuay, Inc.

Deck Equipment

On the boat deck there are installed under aluminum gravity type davits 10 lifeboats as follows:

- Four—36′ 6″ by 11′ 9″ by 5′ 3″, 135 person lifeboat hand propelled;
- Two—36′ 6″ by 11′ 9″ by 5′ 3″, 105 person lifeboats motor propelled, and radio equipped;
- Two—26′ 8″ by 8′ 3⅝″ by 3′ 7¼″, 46 person lifeboats; and
- Two—26′ 8″ by 8′ 3⅝″ by 3′ 7¼″, 46 person rescue boats oar propelled.

The total person capacity here is 934, or more than enough to take care of the full complement of 890 passengers and crew.

Each pair of davits is served by an electric winch of capacity for hoisting the fully loaded boat safely at 20 fpm and for safely lowering at 100 fpm In addition to the lifeboats there are sufficient life rafts carried to take care of 25 per cent of the total personnel. These rafts may be launched over the side or will float free in the case of sinking of the vessel. A life preserver for every person aboard and 18 life buoys are also carried for emergencies. All of the boats, davits and winches were supplied by Welin Davit and Boat Corp. All of the boats except the after pair are handled and passengers embarked from the Boat Deck. In the case of the after pair of boats they are handled from the Boat Deck and passengers embarked from the promenade deck.

The electric drive Lidgerwood windlass is mounted forward on the promenade deck and is of the horizontal shaft, double wildcat, double gypsy type, the entire assembly including electric motor being installed above the weather deck. This equipment is capable of hoisting two stockless cast steel anchors each weighing 15,575 lbs. and two 165 fathom lengths of 2⅝″ NACO steel stud link chain, each weighing 11,630 lbs. at a rate not less than 30 fpm. Either gypsy head must have a line pull of 20,000 lbs. at a speed of 30 fpm. and a no load speed of not less than 75 fpm. The motor for this windlass is rated 125 hp 230 volts, approximately 600 rpm.

The steering gear is of the Lidgerwood hydro-electric double ram four cylinder Rapson slide type, located directly over the rudder on "C" deck. It is capable of moving the rudder from hard over to hard over (70°) in less than 30 seconds when the ship is going ahead at a speed corresponding to the maximum designed shaft hp and at full load draft and in less than 60 seconds when going astern at 40 per cent of the maximum shaft horsepower. The rudder may be independently operated by either ram. The maximum working pressure ahead or astern must never exceed 1500 psi. The hydraulic pumps for these gears are in duplicate, each pump having capacity to handle the gear. Each pump is driven by a 50 hp 440 volt A.C., 3 phase 60 cycle motor operating at 1800 rpm. These motors may be controlled from four steering stations: a pair of trick wheels in the steering gear room; a mechanically connected after deck steering wheel station; the standard station in the pilot house; and a station on the pilot house top. At the last two the control is by hydraulic telemotor connection for manual steering, and by Gyro Pilot system for automatic holding to the course. Suitable switch-over arrangements prevent any interference between the steering systems.

Ten single drum and six double drum electric drive winches, of double reduction gear type are provided for cargo handling at the six hatches. These winches are driven by 50 hp d. c., 600 rpm, 230 volt motors, and are capable of handling: 1½ tons at 290 fpm; 3 tons at 220 fpm; and 10 tons at 56 fpm. They were manufactured by Lake Shore Engineering Co. with motors and controls by Westinghouse.

Two 24 inch vertical Lidgerwood capstans driven by 35 hp, 230 volt d. c. motors through gearing are each capable of exerting a 20,000 pound pull at 30 fpm on warping or other hawsers. Motor and gearing are installed on deck below.

An interesting advance in the design of cargo handling machinery is the Lake Shore Engineering Co. side port loading-discharging crane for hatch No. 4 which tops on "A" deck. Two bridges each carrying one trolley and each capable of handling 2½ tons safely are installed for athwartship travel in unison. The travel of the bridges is served by a 10 hp motor; the travel of the trolleys by a 15 hp motor, and the hoist drums are operated by a 50 hp motor. The bridges at the limit of their travel have sufficient outboard projection to give the trolley 15 feet clearance from ship's side.

Another interesting item of cargo handling equipment is a pair of portable cargo oil pumps supplied by the Waterous Company. These are of the rotary type with herringbone reduction gears driven by Westinghouse 30 hp, 1800 rpm motors and each pump will discharge 350 gpm against 100 psi with 440 rpm of the pump rotors. These pumps are handled by three electric motor drive whip type hoists each with a capacity for lifting two tons at 25 fpm.

Two elevators by Otis are installed, one for passengers and one for baggage each capable of lifting 2000 lbs. at 100 fpm. The passenger cage travels from "B" deck to the promenade deck and the baggage elevator from "C" deck to the upper deck.

Navigating Equipment

The pilot house, navigating bridges and pilot house top are equipped with all the most modern devices for making navigation simple and safe.

Gyrocompass system includes one Sperry Mark XIV master gyrocompass and eight repeaters mounted and located as follows: steering type repeater on gyro pilot control stand in wheelhouse; steering type repeater on column stand on wheelhouse top; bearing type repeater on column stand at after steering station; bearing type repeater on column stand, port and starboard on bridge wings; bearing type repeater bulkhead mounted in master's office; steering type repeater bulkhead mounted in steering room; and repeater mounted in radio direction finder. An automatic course recorder of the gyrocompass repeater type in the chart room keeps accurate records of all courses.

A Sperry gyro-pilot system provides complete and in-

dependent electric telemotoring for either manual or automatic control of the stroke of the main steering gear pumps. The control unit of this system is mounted in the wheelhouse.

A Submarine Signal Co. echo depth sounder provides visual and recorded reading of the depth of water under keel. This instrument has a range of from three fathoms up and its readings are accurate within 2 per cent.

Two systems of sound powered telephones are used. System A keeps the wheel house in communication with: the wheelhouse top; the chart room; the forecastle head, the crow's nest; the captain's office; the radio room; the stern capstan; the steering gear room; and the after steering station. System B connects the wheelhouse with the foreward engine room operating station, the after motor room; the Chief Engineer's office, the emergency generator room; the steering gear room, and the electric distribution room. Voice tubes connect the wheelhouse with the radio room, the wheelhouse top, the master gyro room, and the captain's stateroom.

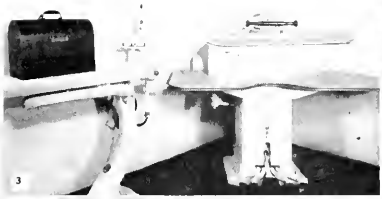
Port and starboard propeller shaft revolution indicators indicate the rpm and direction of rotation of each propeller. A waterproof mechanical seven digit counter and electrical transmitter are installed on each shaft and

Passenger Service Shops

1 Washing section of ship's laundry. 2 Gymnasium. 3. Tailor shop 4. Dog kennel 5. Barber shop. 6. Beauty shop. 7. Flower shop.


1


2


3


4


5


6


7

waterproof electrical indicators: at each engine control stand; on forward bulkhead above windows in the wheelhouse; and in the chief engineer's office.

A Navy standard magnetic compass with complete azimuth circle is mounted on top of wheelhouse; a standard magnetic steering compass and binnacle in the wheelhouse; and a standard magnetic steering compass at the steering station aft.

The Electronic Navigator, General Electric's equipment for radar navigation, is installed so that regardless of visibility the navigating officer is able to detect visually any approaching vessel or other floating object and any landfall in ample time to avoid collision or stranding.

The radio direction finder is the latest model of the Radiomarine Corporation of America and is located in the chart room.

A Leslie Tyfon whistle and whistle control with control stations in the wheelhouse and on the navigating bridge, port and starboard, is arranged for both electric and manual operation.

The ship's radio telegraph and telephone installation was supplied by R.M.C.A. and consists of four radio telegraph transmitters of various frequencies and four receivers of various frequencies covering all the regular and emergency requirements of a passenger liner radio service. A harbor type radio telephone transmitter receiver takes care of ship to shore conversations in or near harbors. Each motor lifeboat is equipped with a radio telegraph transmitter and with a storage battery of sufficient capacity to operate this transmitter-receiver continuously for at least six hours.

In connection with the ship's radio there is an automatic alarm that responds to the ship's radio call letters and rings bells in the pilot house, in the radio room, and in the radio operator's cabin.

One broadcast and high frequency receiver is provided together with loud speakers in the mess rooms, the dining rooms, the lounges, the dance floor and in other public rooms to provide for entertainment of passengers and crew.

Safety Systems

A complete C-O-Two Fire Equipment Co. fire detecting and extinguishing system provides detection of smoke by eye, ear and nose through two cabinets in the wheelhouse which indicates the space from which the smoke comes and are combined with a carbon dioxide fire extinguishing system in the 51 spaces covered. These spaces include: cargo holds, cargo 'tween deck spaces, trunks to cargo spaces; and special cargo lockers; paint and lamp rooms, carpenter shop, engineer's paint locker and oil lockers; wiring trunks; provision and other store rooms. Separate C-O-Two systems are provided for the machinery spaces and for the gyro room, the projector booth film locker, the emergency generator room and similar spaces.

In each engine room a hose reel unit is installed having two 50 lb. carbon dioxide cylinders and sufficient length of flexible reinforced hose to reach any part of the space.

The special C-O-2 hose reel fire extinguishing equipment for the propulsion generators and propulsion motors was furnished by Walter Kidde and Company, Inc.

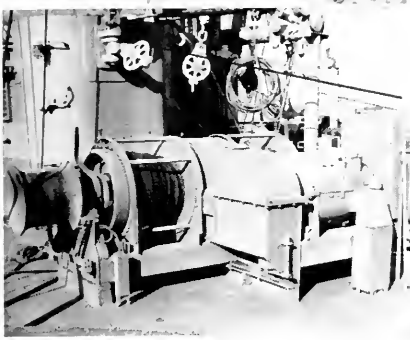
A complete water fire extinguishing system is served by four horizontal centrifugal pumps, two in each engine room. Each of these pumps is driven by a 50 hp motor and has a capacity of 400 gpm against 55 psi or 225 gpm against 125 psi. This system has an 8-inch pressure gage located in the fire control room so that the watchman on duty there can see at all times that the necessary pressure is maintained. Fire hydrants and hose racks are installed so that any point may be reached by two separate hose outlets.

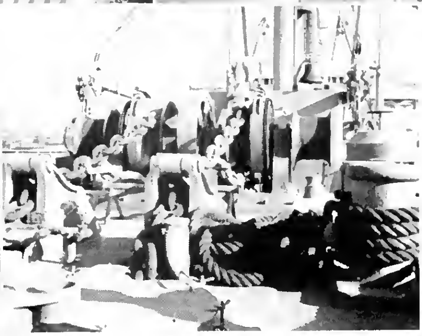
An electrical thermostat and annunciator system covers all spaces not protected by the smoke detection system, and this system rings an alarm and indicates space and zone affected on an annunciator panel in fire control room. Fire doors are fitted to stairway enclosures and to fire screen bulkheads. These are of the hinged self-closing type and can be released by electric control from the

Coincident with such modern handling facilities as the Si-Porter, attention to the care of cargoes enroute is also receiving wide attention in that "Cargocaire" has been installed, as it is at the present time in more than 150 vessels covering trade routes throughout the world.

Two views of Lake Shore Engineering Company Si-Porter cargo handling device. Far left: Si-Porter winch room. Left: Si-Porter extended with load from side of vessel.

Right: Machinery room for two large Lidgerwood capstans on deck above. Far right: Pawling & Harnischfeger two-ton winch for handling cargo oil pumps.





Far left: One of the Lake Shore Engineering compound gearing two drum cargo winches.
Left. Lidgerwood Anchor Windlass looking aft, showing ship's bell and cargo booms in background.

fire control room. A system of watchman's clocks monitors the watchmen and is supervised by the fire control room. Thus a man on watch in the fire control room can supervise all fire risks and extinguishing systems on the vessel and promptly apply the water or the CO_2 to the best advantage.

Watertight doors of the electrically operated horizontal sliding type are fitted between the motor rooms and the shaft alleys and between the motor rooms in the centerline watertight bulkhead. Same type doors provide access through the watertight bulkheads on "B" and "C" decks. These doors are controllable locally and from a central control station.

Refrigeration Machinery

There are thirteen refrigerated cargo compartments in each vessel with a total volume of 52,350 cubic feet. Estimated load for the total volume with each compartment maintained at the most severe conditions is 90.05 tons of refrigeration.

The nine ship service compartments have a total volume of 17,575 cubic feet.

In addition to the above there is the refrigeration load in connection with the extensive air conditioning system. Each of these is a separate system of the direct expansion Freon type.

All the machinery for these systems is installed in one compartment.

Serving them are the following pumps, supplied by the Warren Steam Pump Company, Inc.:

Three 5″ vertical centrifugal refrigerator condenser circulating; two 4″ vertical centrifugal chilled water circulating; three 3″ vertical centrifugal brine circulating; one 1½″ vertical centrifugal air conditioning hot water circulating; two 1½″ vertical centrifugal air conditioning hot or cold water circulating; one 2″ vertical centrifugal warm brine circulating and mixing; and one ¾″ horizontal centrifugal ice water circulating.

For cargo refrigeration there are three Frick Freon-12 systems, each compressor being driven by a d.c. 240 volt 100 hp Westinghouse marine type motor.

On the air conditioning load there are two Carrier

Below: Hatch, looking down through the decks.

The Lube Oil Heater and Cooler (one to each engine room), Bethlehem-made. Pumps are Quimby. Also Wagner Electric motors, Ruggles Valves. At lower right is the De Laval Oil Purifier.

systems each served by a Carrier multi-stage centrifugal compressor. One compressor is driven by a 150 hp 3 phase 60 cycle 440 volt a.c. Westinghouse marine type motor, and the other by a reduction geared steam turbine. This air conditioning refrigeration takes care of the cooling of air for the cargo hold air conditioning system in addition to the extensive air conditioning load for the passenger and crew accommodations.

Propulsion Machinery

The P-2 design is for turbo-electric drive and its most distinctive feature is the complete separation of its two power plant units and of its two motor units. Each power unit comprises two Combustion Engineering Company boilers generating steam at 600 psi and 840° F for a General Electric turbo generating set that has an output of 6890 K.W. at 3500 volts, 3 phase 60 cycle at 3600 rpm and supplies this current to a synchronous propulsion motor normally rated 9000 shp at 120 rpm and with a maximum capacity for 10,000 shp at 124 rpm—3610 volts. Each generator is normally at full power direct connected to one of the motors giving a normal shaft horsepower of 18,000 on the twin screw propellers or a maximum rating of 20,000 shp.

In each engine room there are two General Electric five unit turbo-generating sets. Each set consists of a steam turbine rated 600 K.W. at 10,033 rpm connected, through an enclosed reduction gear, to a 500 K.W. 450 volt 3 phase 60 cycle 1200 rpm a.c. generator, a 200 K. W. 3 wire 240/120 volt 1200 rpm d.c. generator, and a booster exciter 750 amp. at 100 volts 1200 rpm. The a.c. generators supply power for general auxiliary ship's service. The d.c. generators supply excitation current for the propulsion generators and the propulsion motors.

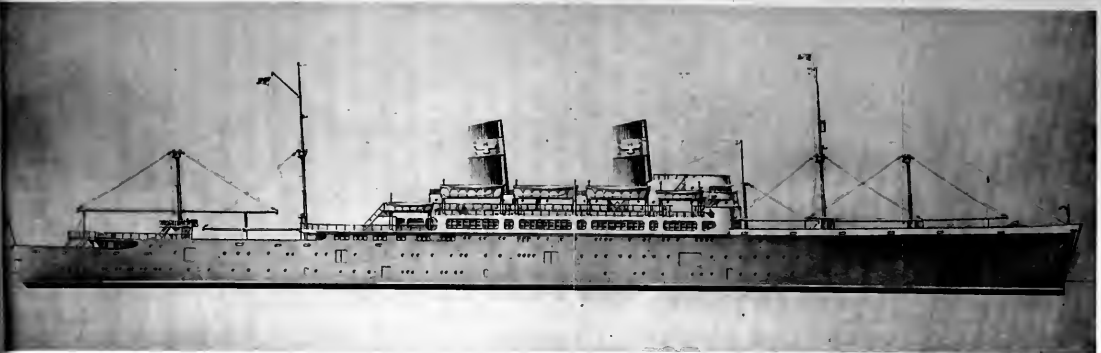
The boilers in each engine room are served by Hagan Automatic Combustion Control equipment that maintains a constant steam pressure and the correct fuel and air ratio for complete combustion of fuel. Todd Hex-Press oil burners take care of correct atomizing of the fuel. Copes thermostats mounted at the front of the boiler drum operate the feed water regulating valves. Reliance water gages are used to indicate the water level. In each boiler uptake there is installed a Wager smoke indicator. In each boiler 10 Diamond Soot Blowers are fitted—three in the superheater section, two in the small boiler tube bank, and five in the economizer. Three Crosby safety valves protect each boiler, two in the drum and one at the superheater outlet. All the miscellaneous valves used in these boilers are Edward with EV alloy seats. Furnished with the boilers for cleaning the interiors of tubes are Wilson pneumatic turbine drive tube cleaners.

Specifications call for a maximum consumption in each boiler of 3002 lbs. per hour of 18,500 B.T.U. oil. That would be 12,028 lbs. per hour for all four boilers which figures at close to 0.66 lbs of oil per brake horsepower hour for propulsion or something like 0.635 lbs. per shp hour for all purposes. This indicates a very high boiler efficiency and also the importance of the steam generator in low fuel consumption per unit of power. The sides and rear of the furnace space are lined with 2″ water-wall tubes. On the uptake side there are three rows of these 2″ tubes, back of which are the superheater elements which are held in position by two sets of alloy support castings clamped at each side to two pairs of 2¼ inch support tubes. Back of the superheater is a bank of 1¼ inch boiler tubes. Two baffles and a partition plate direct the flow of the hot gases up through the superheater elements down through the bank of 1¼″ boiler tubes, and up through the economizer. The feed water enters the economizer at the top and emerges at the bottom on its way to the boiler steam drum. An economizer is thus a last stage feed water heater utilizing the heat left in the combustion gases from the boiler furnace.

A forced draft blower is provided for each boiler. This blower takes its suction air from the machinery space and delivers it to the furnace front of the boiler through an air preheater which is heated by 75 lbs. steam bled from the main turbines. This pre-heater raises the combustion air from 100° F to 280° F.

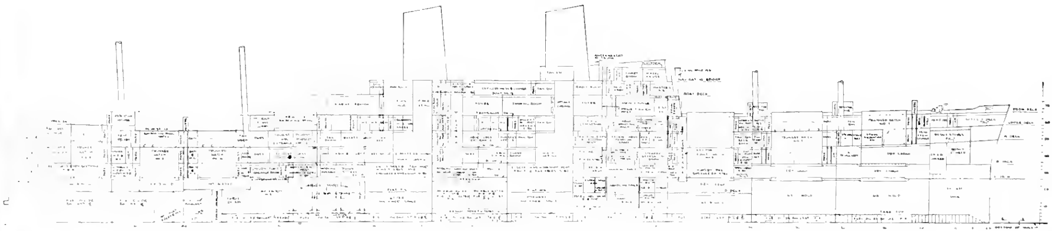
Two fuel oil service pumps each capable of serving both boilers are provided in each engine room. These pumps take suction from the fuel oil settling tanks and deliver it to the burner headers on the boiler fronts

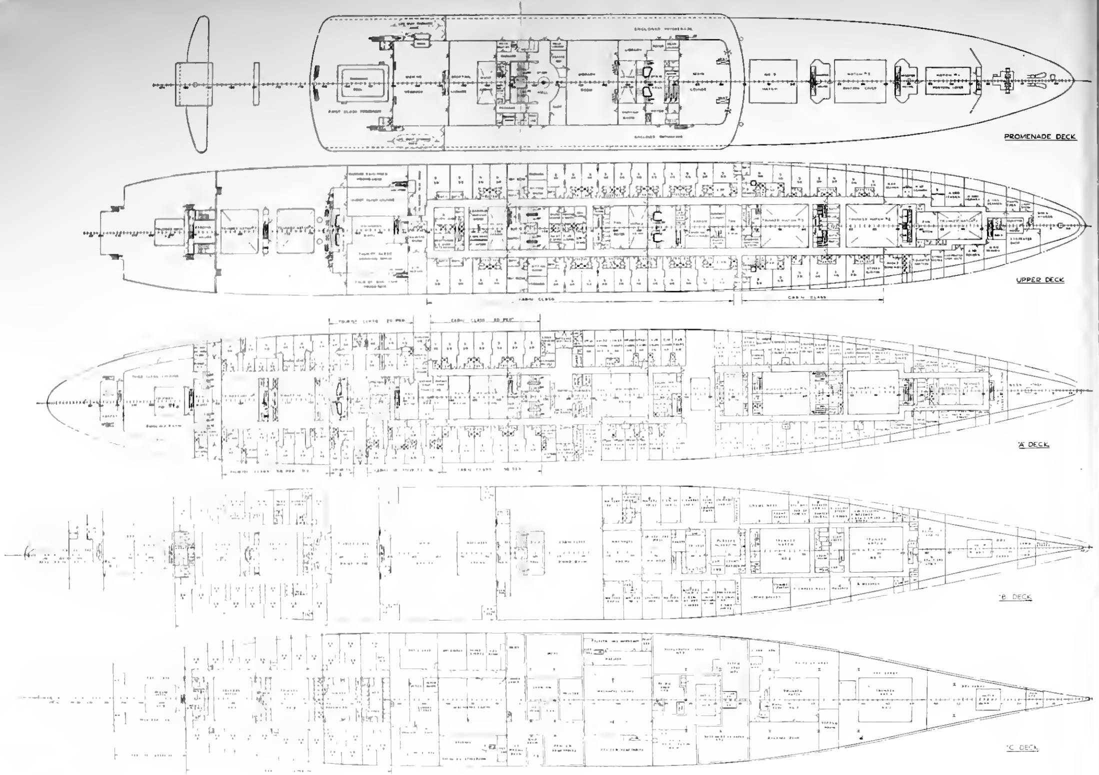
Swimming pool aboard Cleveland.



PRESIDENT CLEVELAND—Artist's Conception

Below-Inboard Profile
Reverse-Deck Plans




PROMENADE DECK
UPPER DECK
"A" DECK
"B" DECK
"C" DECK

through the fuel oil heaters. Three of these heaters are provided in each engine room. Any two are capable of heating 6500 lbs. of Bunker C fuel oil per hour from 100° F to 230° F when supplied with steam from the contaminated evaporator at 50 psi gage. The water drains from all oil heaters are pumped to the contaminated evaporator where they are heated to wet steam at 100 psi by desuperheated steam at 250 psi. As will be noted in the trial results herewith, the steam generating plant exceeded specified performance.

Steam from the boilers comes through a short pipe lead to the main turbine in each engine room at 590 psi 815° F total temperature for normal operation at 9000 shp and at 585 psi 845° F total temperature for maximum output at 10,000 shp. The turbines are of the General Electric impulse reaction type. Each turbine is mounted over and exhausts directly into its condenser which is of capacity to maintain a vacuum of 28.75 inches hg when its unit of the propulsion machinery is developing 9000 shp ahead with normal extraction from the turbine. Condensate and feed water system is of the closed type and follows the U. S. Navy-Maritime Commission flow type that has become practically standard on marine turbine drives. There are two condensate pumps to each condenser. The suctions of these pumps connect to the hot well under the condenser. This discharge is through the intercondenser of the main air ejector, the drain cooler, the gland cooler, the after condenser and the first stage heater to the deaerating heater. From the deaerating heater one of the two main feed pumps takes the feed water and discharges it through the economizer to the steam drum of the boilers. Each auxiliary condenser is served by a similar condensate and feed system discharging to the deaerating feed heater. Arrangement of piping and tankage in each engine room provides for feeding of boiler compound into the feed pump discharge.

Each main generator is equipped with a totally enclosed ventilating system having fans integral with the generator rotor. The air coolers are mounted below the generator frame. Cooling water is forced through the tubes of

Commodore Nelson at the control box of his automatic blanket. There is a supply of these General Electric blankets available to passengers.

Mike Ryan, Naval Architect; Emmet Jones, Chief Hull Draftsman, Bethlehem-Alameda; Fred Doelker, W. R. Grace.

these coolers by a motor driven pump and the capacity is such that at maximum power requirement the ventilating air must be kept at 40° C when the circulating water enters at 85°F. The same type of ventilating system with the same requirements is used on the propulsion motors with the exception that the fan is external and operated by a separate motor.

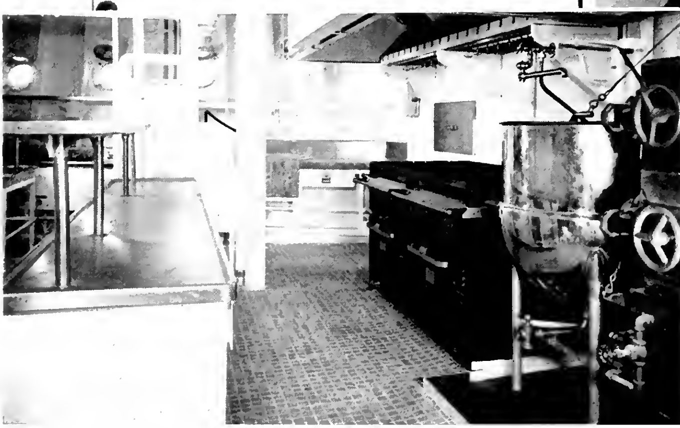
A main control panel in each engine room adjusts the circuits between each main generator and its corresponding propulsion motor. These panels are of the dead front type. Combined with transfer panels in the motor rooms these panels make possible any workable combination of generators and motors.

The J. O. Martin Company furnished some 52 King gages on several panels in convenient locations in the engine room which permit accurate centralized reading of the quantity of liquid in the fresh water, lube oil, diesel oil, fuel oil and gravity tanks. The gages not only eliminate the daily necessity of taking soundings at each individual tank but the system is so designed that accurate remote readings can be had on tanks which cannot otherwise be measured with a tape, rod, or float device because of inaccessability of the sounding tubes. The gages are located near the pumps or valves which fill the tanks so that for taking bunkers, and for trimming the tanks when loading or at sea one man can accomplish this work from a centralized King Gage panel.

With the exception of the main feed pumps and a few stand-by pumps practically every auxiliary machine on these ships is motor drive. All of the auxiliary power circuits and lighting, cooking, and heating circuits are distributed from the switchboards in the main engine rooms through a panel board system. The panel boards, the motor controls and practically all of the motors in these systems are supplied by Westinghouse.

An interesting installation in each engine room is the low pressure distilling plant built at Bethlehem's Fore River plant. Each of these plants will produce fresh water for boiler feed and for domestic purposes at the rate of 40,000 gal. per 24 hours.

Clean oil for turbine lubrication is insured by De Laval centrifugal oil purifiers of the latest type installed in each engine room.



Top to bottom: Section of main galley serving cabin class; section of tourist class galley; third class galley.

Galleys

The most important function on a passenger liner, aside from safety and reliability of the hull and the propulsion machinery, is the preparation of food for the passengers and the service of that food in the dining rooms. Excellence of sleeping comfort, luxuriousness of furnishing, eye satisfaction from elaborate decor, entertainment through the ear or the eye, all quickly lose their charm unless the passenger is fed regularly with appetizing and satisfying meals served promptly and courteously on well-set tables in a well-ventilated room. Therefore, in many respects, the galley and its auxiliary compartments, are the most important part of a passenger vessel.

The *President Cleveland* has four galleys and numerous pantries fitted with the most modern electrical equipment for preparing and for cooking food. These are the Cabin class galley, the Tourist class galley, the Third class galley, and the crew's galley. All of these galleys are on "B" deck adjacent to the dining rooms they serve.

Cabin class and Tourist class galleys are in one compartment of the hull located aft of the Cabin class dining room, and forward of the Tourist class dining room. Reference to the general arrangement plan of "B" deck will indicate that the space occupied by these two galleys is larger than either of the dining rooms they serve. Note also that on "C" deck immediately below the Cabin class dining room and the galley space are located the dry and the refrigerated stores that serve these spaces.

In the space occupied by the main galley are arranged not only the two galleys, but all their auxiliary pantries, and the arrangement is so planned that all service movements are streamlined. No waiter coming out of either dining room crosses the path of a waiter going in. Path of the outward-bound waiter brings him into contact with the equipment that takes care of soiled tableware, cutlery and napery. Path of waiter in-bound is planned to bring him in contact with the service pantries where he fills his orders.

The heart of the kitchen is always the range. *Cleveland's* main galley is fitted with electric ranges by Hotpoint, Inc. Also by Hotpoint are the electric "back shelves" and the "back shelf" broilers; the electric roasting ovens; the electric baking ovens; and the electric deep-fry kettles.

The bakery in this galley is equipped to take care of the bread, cake, pie and pastry needs of the entire ship. This bakery is fitted with a dough mixer built by the Triumph Mfg. Co. of Cincinnati, Ohio, that is served by a Century Wat-a-Mat liquid regulator furnished by the Fred D. Pfenning Co. of Columbus, Ohio. Special bread racks for the finished product were furnished by Union Steel Products Co., Albion, Michigan.

All cooking in all galleys is done on electric ranges or broilers, with the exception of certain vegetables and soup stock which are cooked by steam. All galleys have complete electric-mechanical dishwashing and drying equipment furnished by the Colt's Patent Fire Arms Mfg. Co.

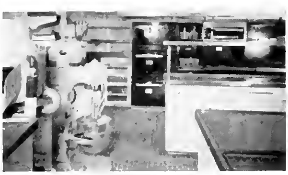
Special pantry spaces provided in the main galley to take care of Cabin class and Tourist class include: coffee service; vegetable preparation and cooking; butchering; pot washing and storage; silver cleaning and storage; dish and glass cleaning and storage; crockery storage; and baking and bread storage. The waiters' pantry and a service bar are located outside the Cabin class dining room. For further food and beverage service outside of dining rooms there are 10 pantries as follows: 3 for crew use; 1 diet pantry; 2 for engine and deck officers, 1 for the captain, and 3 for passenger service.

Presiding over this electrified main galley will be a supervising chef, a sous-chef, a soup and fish cook, a roast cook, a round cook, a grill cook, a vegetable cook, several assistance cooks, a coffee man, a cold meat pantry man and 14 scullions.

Fifty-four waiters will be required to serve all the *Cleveland's* three classes of passengers as well as officers and crew.

Blickman, Inc., of Weehawken, N. J., furnished much

Below: Vegetable preparation room. Top, center: Bakery, showing bread oven.



Below: Hotpoint ranges. Bottom, center: Crew's galley.

of the special pantry and galley equipment.

Concessions

Serving the personal needs of passengers and crew are a number of shops and personal service rooms, including a photographic supply and service shop, a Cabin class dress shop, a Tourist class novelty shop, several barber shops, a beauty shop, a gymnasium, a massage room, a completely equipped steam-heated dog kennel, and the crew's slop chest.

Hospital

A complete four-ward, eight-room hospital is located on "B" deck. This will be under the supervision of American President Lines Chief Surgeon, Dr. Rodney A. Yoell. It is mechanically ventilated and air conditioned, and has sound insulated partitions. There is a six-bed crew's ward, a two-bed isolation ward, a two-bed men's ward, a two-bed women's ward; a fully-equipped operating-room, a dispensary, a diet kitchen, and an attendant's room. Each of the wards has a bathroom adjoining. Two registered nurses will take care of the patients under supervision of the doctor. Included in the equipment are an X-Ray machine of the latest type by General Electric Company, and an obstetrical bed.

When the *Cleveland* has a capacity passenger load and a full crew complement, she will have one hospital bed ready for every 73 persons aboard. One hospital bed for every 200 persons is considered by public health authorities to be adequate for the needs of the average community.

In addition to the hospital, the ship's surgeon will have offices on "A" deck, including a consulting-room with adequate facilities for examination, and a pleasantly furnished waiting-room. Forward on "A" deck is a dispensary for serving minor medical needs of the crew.

Medicines carried aboard would just about stock the pharmaceutical shelves of a modern drugstore. They include practically everything from aspirin to penicillin and an ample supply of blood plasma.

A special nurse will give full-time attention to supervision of the children's playroom.

Unique among steamship lines is the American President Lines' medical department in that it holds that highly coveted award—the American College of Surgeons' Certificate of Approval.

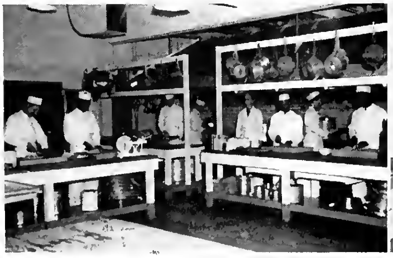
President Cleveland is the most modern, the most luxurious, and the safest passenger vessel now operating on regular schedule across the Pacific. She has a sturdy steel hull of ample strength to take care of itself in any weather. Her propulsion power plant has plenty of reserve power to maintain schedules. Her safety equipment for all emergencies is more than sufficient to meet all requirements. Her ventilation, air conditioning, and commissary are planned to maintain the best health conditions of passengers and crew. She is the most perfectly rat-proofed vessel afloat. Her scheduled route is one of the most exotically romantic in the world. The only thing left to say is, "Buy a ticket!"

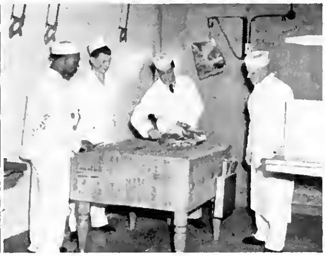
CLEVELAND CREW SPECIALLY TRAINED

One hundred cooks, stewards, waiters and bellboys assigned to the American President Lines' new *President Cleveland* began their "refresher" course November 17 at the U. S. Maritime School at Alameda, California. The intensive four-weeks schooling period preceded the delivery of the 23,000-ton liner from Bethlehem-Alameda shipyard, which took place December 15.

According to T. J. Cokely, vice president in charge of operations, the training is designed not merely to restore prewar levels of service neglected during the war years, but to create new standards of luxury service in keeping with the postwar strides in travel comfort which the *President Cleveland* represents.

All 100 enrollees, whose wages were paid by American President Lines, performed their "schoolwork" under conditions that simulated those on board the big liner. Chefs and cooks prepared meals stressing an international cuisine that duplicate the menus offered during the voyage. An exact replica of a stateroom was built at the school to facilitate standard practices in making the new convertible types of sofa beds. Waiters received a thorough course that includes the serving of wines and





Students enrolled in the Cooking, Baking and Butchering School turn to preparing the courses on the special menu for the day. Individualized instruction designed to give a well-rounded training in food preparation on board ship is the keynote of the course at the Maritime Service Training Station, Alameda, California.

Ship's cooks learn pointers on meatcutting during course of training in the Cooking, Baking and Butchering School.

Commodore and Mrs. Nelson (skipper of Cleveland) at luncheon given for Port Stewards at Alameda.

Harvey Harris, Second Steward, E. Ryan, Tourist Steward and Room Steward of Cleveland in mock-up stateroom at Alameda school.

special dishes, and had actual practice in waiting on all types of guests acting as passengers, including children. Bellboys were specially coached on points of courtesy and tact.

Participating in the course as instructors were Alan Agnew, veteran APL chief steward who will serve in that capacity on the new ship, and Herman L. Schurtz, the vessel's chef de cuisine. Schurtz, former chef on the *Leviathan*, was once characterized by the late Sir Thomas Lipton as "the greatest chef in the world" and has held notable culinary posts in London and Paris and at the Waldorf-Astoria.

The APL refresher course was held in cooperation with the Maritime Commission and the Marine Cooks and Stewards Union. Although many of those attending are prewar personnel of the Line, others include qualified men with hotel experience, and men whose ability has been proved on interim ships of the Company's fleet in operation since the end of the war.

The course, given for the first time on the West Coast, is one of several maritime training courses which the U. S. Maritime School, under the direction of Captain Malcolm E. Crossman, offers seagoing personnel. The APL program was under the direction of Lt. Cmdr. Constantin Bruckner.

Port Stewards Society visits the school. Left to right: Paul Baker, Pacific Transport Lines; Eugene Blank, Pope & Talbot; Con Criminius, APL; P. F. Cannon, Matson; Al Agnew, Chief Steward on Cleveland; Tim Mullin, APL; Al Bissell, Weyerhaeuser; Jack T. McCartney, Labor Relations Consultant, PASA; Frank Inglean, U. S. Lines; Paul Babcock, Pacific Transport Lines.

PRESIDENT CLEVELAND INCLINING TESTS

By EMMET JONES

Chief Hull Draftsman, Bethlehem-Alameda Shipyard, Inc.

The *President Cleveland* was inclined on November 28, 1947 in compliance with Coast Guard Regulations and the Maritime Commission's Specifications for the purpose of determining the center of gravity and the metacentric height of the vessel in the light condition, and from this the available metacentric height and stability in the various conditions of loading. The experiment was conducted by personnel from the Bethlehem-Alameda Shipyard, Inc. and Bethlehem Steel Company's San Francisco Yard under the direction of the Coast Guard.

A ship is said to be stable if it returns to its original position after being heeled over by the wind or by wave action; if it moves farther from its original position it is said to be unstable. The Metacentric height is a measure of stability and is defined as the vertical height from the center of gravity of the vessel to the metacenter. The center of gravity depends on how the ship is loaded while the metacenter depends on the shape of the ship and is virtually constant for any one draft, for small angles of heel. A ship with a small metacenter height will roll slowly and easily and will probably be very comfortable, but may not provide for enough reserve to keep the ship stable if it is damaged. A large metacentric height causes the ship to roll quickly and while it makes the ship safer if damaged it can make

the ship uncomfortable and can cause damage from excessive rolling. The ship's personnel has the problem of loading the ship so that she will be safe enough to satisfy the Coast Guard, which requires that the ship be stable enough to withstand damage, but still be comfortable enough to keep the passengers happy.

These rolling characteristics provide a quick and easy means for the ship's personnel to determine the metacentric height of the ship in service. It is customary to furnish the operator with a table listing period of roll against metacentric height. The table is derived from the formula:

Period of roll (secs.) equals beam of vessel, times a constant divided by the square root of G. M.

The constant is determined at the time of inclining by rolling the ship and measuring the period. Since the G.M. is calculated from the inclining the constant is easily found.

The metacentric height, or "GM", is found by dividing the inclining weight, times the distance moved, by the displacement of the ship times the tangent of the angle of heel. After finding the metacentric height this figure is subtracted from the known position of the metacenter as read off the curves of form, giving the center of gravity of the vessel in the inclined condition. From this the center of gravity in various loaded conditions can be predicted. In practice the angle of heel is measured by noting the swing of a pendulum, which hangs vertically, as the ship heels from the movement of the weights. The displacement is measured as closely as possible from the draft marks and is corrected for the hog or sag of the ship when waterborne, the "built-in" hog or sag of the keel, the specific gravity and the temperature of the water, and the fore and aft trim of the vessel. This displacement, when corrected for liquids aboard, weight of material to complete the ship, and weight of tools, dunnage and miscellaneous material not a part of the ship, is used for the light ship weight in the Certificate of Deadweight.

Emmet Jones

If tanks on the vessel are partially full, heeling the ship causes the liquids to flow to the low side, shifting the center of gravity of the liquid and of the ship and causing the condition called "free surface" for which the results of inclining must be corrected. The correction is not easily made unless the exact boundaries of the surface of the liquid can be determined so every effort is made to eliminate free surface by keeping the tanks either full or empty.

Since the results of an inclining experiment would be inconclusive if the ship as inclined had zero or negative GM the *President Cleveland* was given an extra margin

Cleveland on drydock at Bethlehem Steel's San Francisco yard, prior to inclining. Weights are visible on the forward deck.

Cortlandt W. Quinby and Donald Reardon of the U.S.C.G., Emmet Jones, and William Baker, Asst. to Naval Architect, at Bethlehem's Alameda Yard, checking results.

Period of roll is checked with aid of gunner's quadrant.

of stability by filling double bottom tanks No. 2, 3 and 4 with water. Free surface was eliminated from these tanks by carrying the water level up into the vent pipes and sounding tubes. Fuel oil settlers and potable water tanks were partially full but since the tanks were small and rectangular the free surface effect could easily be calculated. All other tanks were drained while the ship was on drydock and were then visually inspected to see that they were dry. All bilge wells were dried. The ship was in steaming condition, with water in the boilers and condensers, but no machinery was operating. The ship was virtually complete at the time of inclining, lacking only stewards stores and chairs in some areas. All tool boxes, staging, dunnage and yard equipment had been removed so that the ship was, as nearly as possible, in the "Light Condition."

The experiment was conducted in San Francisco between the wing walls of Bethlehem Steel Company's No. 1 Floating Drydock at 7:00 a.m. in order to take advantage of quiet water and to cut down wind disturbance. Pads were welded to the stem and stern at the height of the center of rotation for the purpose of mooring the ship during the experiment. The inclining weights consisted of concrete blocks mounted on flat cars, a total of 41 tons, and running on a track across No. 3 hatch. Wire rope falls, with leads to cargo winches, were rigged for moving the weights.

Three pendulums were used, following USMC practice, with lengths ranging from 22½ feet to 27½ feet. The "plumb bobs" consisted of ⅜" steel plates, 4"x7", slotted and welded together to form an "X" cross section, in order to give the maximum damping effect. These plumb bobs were hung on steel wire and arranged so that they hung in a bucket of oil to damp the swing. Small buckets were used and shifted with each movement of the weights in preference to troughs, since the surging back and forth of oil in a trough is enough to swing the pendulum. Wooden battens were laid on horses so that the deflections of the wires could be marked in pencil and measured off. By marking battens a permanent record was made for future reference.

Telephones were installed connecting each pendulum station with the control station, which was located alongside hatch No. 3, near the weights.

After marking the locations of the pendulums on the battens with the ship upright, deflections were read with the weights moved to 27 feet, 20 feet and 10 feet off centerline to port, then the same sequence was repeated on starboard. The maximum angle of heel produced was about 3¼ degrees.

Pendulum deflections were then converted to tangents of the angle of heel and were plotted against the off center movement of the weights. Any doubtful readings were rechecked before moving the weights to the next position, so that it was possible to know at all times whether the information was consistent. During the experiment all persons not concerned with the security of the vessel or with the test were sent ashore, and all those remaining on board were warned not to move around.

The movement of the weights was sufficiently quick so that a slight rolling motion was imparted to the ship, enough to time the period of roll. A gunner's

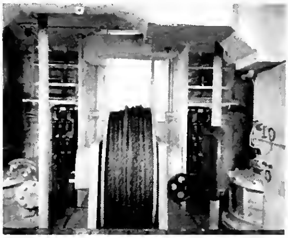
Weights in the extreme starboard outboard position.

THE BETHLEHEM COORDINATORS

Assembled for the last time at the overworked 112 A Deck are Bethlehem's ubiquitous outfitters and coordinators.
Left to right: Dong Kelly, coordinator; George Kralj, coordinator; John Fletcher, coordinator; William Indig, asst. outfitting superintendent; Jeff Burke, coordinator; Elmer Gibson, coordinator; Clarence Rawlings, coordinator; G. L. Matheson, outfitting supervisor; H. Graves, coordinator; A. Benton; T. A. Minot, head outfitting supervisor; C. H. Kretschman, acting general superintendent; R. Mahan, asst. to manager (inspection); J. F. Schmidt, Jr., asst. outfitting and machining superintendent; also present, but not shown in the above picture was R. O. Eidell, coordinator.

quadrant with a sensitive bubble was used to determine the start and finish of the roll. The gunner's quadrant was also used to give a quick measure of the angle of heel.

The entire procedure was completed by 10:00 a.m. and the ship was then moved out of the drydock and was returned to the Bethlehem-Alameda Shipyard to be fueled and provisioned for her sea trials and delivery.



Main capstan machinery room.

$500,000 went for ratproofing on the Cleveland

George Buchanan and Andy Paisal, of Aetna Marine.

Showing Schlage locks on bulkhead doors. These marine fittings are throughout the ship.

Ship to shore Radiomarine telephone.

ACCEPTANCE OF SHIP

T. C. Ingersoll (center, background) manager of Bethlehem-Alameda Shipyard, Inc., signs President Cleveland completion certificate in brief ceremony at the Yard. Accepting the vessel on behalf of the Maritime Commission is Paul M. Mulvany, construction representative (left, foreground). The Commission then turned the Cleveland over to American President Lines, represented by T. J. Cokely, vice-president in charge of operations (third from left). Also officiating at the ceremony were Ray Strickland, chief of control, Bethlehem-Alameda (second from left); asst. to Mr. Strickland (fourth from left); George Jackson, asst. superintending engineer, APL; Commodore Henry Nelson, master of the new vessel; Donald Day, American Bureau of Shipping.

Commodore Nelson at the Electronic Navigator. This radar instrument will aid in guiding the big ship through channel or sea, through fog or storm or night.

Taken in side-port loading room: Left to right: K. W. Nasi, U. S. Public Health Service; W. A. Williamson, Lt. Cmdr. U.S.C.G.; W. R. Gill, Lt., U.S.C.G.; David Neilson, Head Hull Inspector, U.S.M.C.; H. R. Carlson, U.S.P.H.S.; James Scott, Asst. Maritime Director, Pacific Coast; J. H. Conlon, Lt. Cmdr., U.S.C.G. These people represented the three official bodies for whom the sea trials are run.

Commodore Henry Nelson, Master of the Cleveland, and George Killion, president of American President Lines which will operate the 23,000-ton passenger ship, raise the APL house flag as the President Cleveland is delivered from the Maritime Commission to APL. The flag-raising ceremonies took place aboard the liner at Pier 44 from which the Cleveland later sailed for the Orient with a capacity passenger list of 550 persons on its maiden voyage. Others in the group, left to right, are: Lloyd Fleming, Maritime Commission representative on the West Coast; T. J. Cokely, APL vice president in charge of operations; and E. Russell Lutz, executive vice president of APL.

U.S.M.C. Inventory Crew, left to right: E. R. Worst, L. H. Helmke, R. E. Saelens. This is one of the toughest jobs, involving receiving, checking, boxing, stowing, delivery, inventory of all movable and removal parts and spare parts with official Washington allowance lists. The spare parts inventory alone amounts to half a million dollars.

THE PRESIDENT CLEVELAND INTERIORS—

HOME COMFORT AT SEA

Interior Design and Decoration

Public rooms and staterooms on these new President liners are decorated in American moderne style very deftly accentuated by occasional introduction of Chinese motifs, thus saluting both America and the Orient. Responsible for the design is the Interior Decoration Division of George Sharp, Naval Architect, New York. Execution of the design and of all joiner work, ventilation ducts and much other light construction, was contracted by Aetna Marine Corporation.

First impression on entering the

Top picture: Veranda de luxe suite; bedroom is to the left.

Bottom: Cabin Class Stateroom.

Enclosed Promenade Deck.

promenade deck is spaciousness. Most of the promenade in way of the superstructure erection is enclosed with Kearfott Clear Vu windows. Much of the inboard bulkheads separating this promenade space from the public rooms, is in large fixed glass windows and this combination produces the illusion of great wide-open spaces. The promenade itself is wide so that with six-footers stretched out on steamer chairs against the inboard bulkhead, there is still a wide promenade free to pedestrians. Twelve times around this deck equals a mile, says the sign. Ships figure in nautical miles so there must be approximately 250 feet of this promenade, on port and starboard sides.

The deck of the promenade is covered with dark green Koroseal (Vinyl plastic) molded into a diamond-shaped pattern with semi-abrasive surface and with small gutters outlining the pattern. On laboratory tests, this comparatively new material proves to have: many times the wearing qualities of rubber or linoleum; a much harder surface than any other comparable deck covering; a great degree of fire resistance; and possibilities in color

Top picture Foyer

Left: Library.

schemes that are only limited by the imagination of the designer. The same material is used on the Cleveland in many forms such as simulated leather and patent leather upholstery materials, and shower curtains. It is a product of the B. F. Goodrich Company and was supplied to the Cleveland by Sloane-Blabon Corp. of New York.

All public deck spaces not carpeted are covered with moulded Koroseal or Koroseal tile. This application of vinyl plastic deck coverings is said to be the most extensive on any ship afloat.

Interiors of the public rooms on this deck produce the same illusion of great wide open space that prevails on the promenade and for the same reason plus the lavish use of plate glass doors between the rooms. The arrangement and comparative size of the public rooms and the swimming pool are shown on the plans herewith.

Main lounge, a large room with abundant fenestration, is decorated and furnished in restrained good taste. Focal point is the large fireplace with mirror above, central on the aft bulkhead. Into a niche in the mirror is set a specially-designed

Top picture: Tourist lounge.

Right: Tourist class stateroom.

Chinese style clock and flanking the fireplace on each side are green lacquered cabinets trimmed with golden bronze and supporting porcelain figurine lamps in modern Chinese motif. A beautiful pair of davenports with end tables form an ingle nook. Occasional chairs and tables in excellent taste and design for luxurious comfort are supplied in adequate quantity. Notably and thankfully missed is that great confusion of large overstuffed atrocities that usually fills the main lounges on the passenger liner. Arnot & Company, engineers and designers of distinctive furniture have produced sleeping accommodations and public room equipment that combine passenger luxury with space-saving efficiency.

Forward foyer and stair hall features a large mural on the after bulkhead of the well. This mural depicts the hills on each side of the entrance to San Francisco Bay, the Golden Gate Bridge and the outer portion of the bay.

The Smoking Room, a somewhat larger room than the main lounge, is panelled beautifully in mahogany. The predominant note in decor and furniture is a restrained moderne American, and the Chinese motif is touched only in a modern Chinese chest with jade handles, and in the decorative treatment on the base of table lamps. On the port and starboard sides of this room are built-in seats upholstered in Koroseal and arranged in sections to accommodate small groups. As in all the public spaces the lighting is indirect and is concealed in a ceiling soffit so skillfully harmonized as to be scarcely noticeable when the lights are off. This soffit directs soft illumination onto bulkheads and ceiling, giving dim daylight illusion.

Next in order aft is the main entrance hall and stairwell with its flower and gift shop starboard, and service bar port, and the same interesting brass stair rail design already described. Central in decor motif here are the elevator doors done in Chinese style gold on black background.

Short passages port and starboard contacting service rooms lead to the cocktail lounge where we pass immediately into modern China. Along the after bulkhead upholstered booths are topped by a wall curving forward and upward to the ceiling. Between this wall and the top of the upholstered booth seat is a depressed recess which reflects indirect lighting on the wall. The wall itself is painted a deep Chinese red and is decorated with Chinese line designs in gold wire. The color scheme, even the forms of chairs, tables, bar stools and their pedestals, and the bar itself, are all reminiscent of Chinese art and architecture.

All upholstered furniture in the ship and all built-in upholstered seats are stuffed with interlaced curled hair supplied by the curled hair division of Armour and Company, Chicago. This product is curled hair knitted into burlap or cloth sheeting, and made up into rolls or cut to special patterns to suit the job. Finishing hardware in brass, bronze and white metal was furnished by P and F Corbin of New Britain, Connecticut. This includes concealed holders to operate all fire doors, heavy duty overhead checks on all self-closing doors, cast bronze olive knuckle self-lubricating butts for all doors, door stops and holders, push plates, lavatory bolts, strikes, coat and hat hooks, bumpers and handles. Door locks, the heart of shipboard hardware, are Schlage Lock Company's rust-proof marine product.

The Marine Veranda follows the suggestion of its name and creates the feeling of outdoors and a night club at the same time. Heavy white classical moldings outline doors and contrast with the dark walls. Windows on three sides of the room are richly draped in eggshell mohair with a banana leaf design. The orchestra backing — painted the same as the wall — is combed to show its silver lining. To carry out further the veranda effect, chairs are made of open-work cast aluminum painted white. Pierre Bourdelle, an artist well-known for his work in carved linoleum, produced panels for the face of the movie projection booth and for wall space above the windows. Vinyl tile is used as deck covering in the Veranda. An off-white feature strip circles the midnight blue dance floor, repeating the curved design of lighting ingrown into the ceiling above the tables.

Illustrations herewith give a much better idea of the public rooms than could be conveyed by a multitude of words, attempting a detailed description. Just outside the after windows of the marine veranda on the open portion of the promenade deck is the cabin class built-in swimming pool, finished in ceramic tile and equipped with a wide beach space.

Sleeping Accommodations

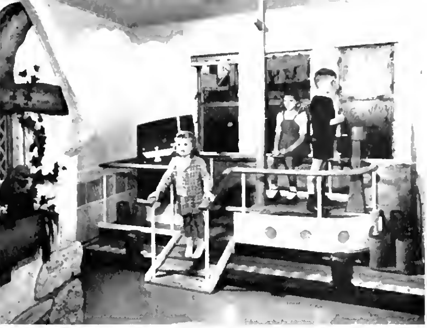
With very few exceptions, cabin class staterooms are located at the ship's side. They vary in size and passenger capacity, but the average room with its generously proportioned private bath and extensive wardrobe and trunk space is equipped for three people. Through careful design and arrangement of furniture, the atmosphere of an intimate sitting room or lounge is created, suiting the room to daytime living. Beneath one or two softly draped airports, unified as one large window by a venetian blind, sits a sofa bed. It is upholstered in an original pinstripe mohair and has the dimensions and appearance of a regular sofa. The existence of wall-flush upper and lower berths opposite is barely indicated by their outlines on the wall. At night passengers push buttons and births glide from their vertical, stowed position and with further digital pressure on another disk, the back of the sofa bed slips casually down to rest on the seat. Thus, quickly and easily, the room is transformed into a bedroom—beds made up and ready for use. Here again Arnot & Co's. engineering skill has made itself apparent, and the Arnot Guest-operated Sleeper has revolutionized shipboard living, making every room a suite.

The staterooms, their furniture and other facilities, are planned to please the passenger whether his desire of the hour be to sleep thoroughly on a luxurious mattress of foam neoprene-rubber, or to entertain from a comfortable lounge chair upholstered in the same resilient material. If he likes to read late into the night, without disturbing

PICTURES ON FACING PAGE

Top: Writing room.

Bottom: Main lounge, with fireplace.



Left: Children's Playroom.

Below: The Marine Veranda.

others, he may flick off the end table lamp, turn on a light in the serrated glass cylinder which forms the lamp's base and direct light to his book only.

To serve the feminine traveling world, a vanity unit is concealed in the graceful modern dresser. Miss America, or her sister, simply pulls out the top drawer of the dresser, raises and tilts back a mirror-faced lid revealing a spacious compartment made to care for small bottles, jars and such necessities. Thus, reposed in a neat vanity chair, surrounded with equipment and adequate lighting she goes painlessly to work. When she finishes, another job can be accomplished with the top down. The smooth surface of the open drawer's cover heartily suggests that the stationery in the next compartment is destined to be used for a letter home. Thus the dresser becomes a desk!

Each ship offers two de luxe suites of three rooms each, specially endowed to please the most demanding critic. The layout comprises a real bedroom, a sitting room and a "veranda" lounge with large observation windows. Instead of creating a contrast, as in other staterooms, by setting bleached oak furniture and light shades of upholstery against darker, shadow-soft walls, the designer has done these suites in the more conventional, reverse color scheme, maintaining at the same time the simplicity and grace found in modern lines of furniture throughout the ship. With rich mahogany used for woodwork of dressers, tables and chairs, he has mixed a warm blue carpet, light pastel blue walls, textured drapery and upholstery fabrics in tones of beige, rose and dark blue, all of which blend with or complement each other. To match the woodwork, cigarette-and alcohol-proof Formica used for dresser and table tops is made of "realwood" mahogany.

In each stateroom—for comfort's sake— a Carrier "Weathermaster" unit and fan counteract the heat or cold with air conditioning and circulation. Control is either automatic by Minneapolis-Honeywell thermostatic regulators, or manual through manipulation in the room. All cabin class rooms have private phones for intraship communication, and from public booths all ship-to-shore business may be taken care of.

American President Lines is making available to its passengers another innovation in sleeping comfort, the G-E Automatic blanket, on request. All the passenger needs to do is to select the warmth desired, set the control, then let the blanket automatically maintain the same even warmth though temperatures vary greatly on wintertime high seas of the Pacific.

Facilities in the tourist bathrooms include a space-saving combination unit with toilet, Monel-metal wash basin, a medicine cabinet and light.

Left to right Julian Arnst, Assistant Manager, Bethlehem-Alameda, W. O. Schrader, from U.S.M.C., Washington, D.C.; Christian H Lundegaard and Norman A Proffitt, Aetna Marine.

Children's play room showing merry go-round

Suspended on the wall are a streamlined thermo-carafe and a handy satin-finished steel Kleenex cabinet.

Dining Room

Dining "cabin class" cannot help but be an appetizing treat in decor as well as in food. Imagine a sumptuous Hawaiian foliage mural by a prominent artist, Andre Durenceau, blended into a soft grey-blue and beige color scheme; modern red gum buffets trimmed on top with edge-lighted Harriton carved glass panels; add comfort in gold leather chairs at regular tables or congenial chatter at diagonally patterned banquettes beneath a long range of lighted windows. Try Tourist Class—more carved glass—more mirrors, some bleached oak fluted columns—red chairs contrasting with French gray walls, all done with the light hand of restraint for long durability.

Background for all this interior decoration, its support and its strength is the joiner construction designed, manufactured and erected by the Aetna Marine Corporation. Double flush steel divisional panels inclosing a mat of fibre glass insulation, are cleverly formed on the edges to make a strong interlocking joint, which acts as a stiffener. Panel bulkheads of this type eliminate the use of posts or fasteners other than retaining members top and bottom. Even the marine veneer ceilings are Vee-jointed. Doors and frames are fashioned to blend naturally into this construction and form a smooth panelled wall that makes a wonderful base for decorative treatment. These panels are fireproof and extremely resistant to the conduction of temperature, easily passing the tests imposed by Senate Resolution 184. For the structure above the boat deck, the same type of paneling is made in aluminum alloy.

Aetna Marine Corporation deserves great praise for the excellent workmanship and the high finish achieved in the Cleveland's interiors, and for the masterful fashion in which the various decorative motifs were applied.

TOURIST CLASS ACCOMMODATIONS

There are hundreds of thousands of square feet of Johns-Manville Marinite asbestos panels on the ship. They appear in ceilings and walls where their purpose, aside from beauty of finish, is fire protection and acoustical advantage.

1. Stateroom. 2. Passageway, looking aft into third class dining room (portside). 3. Dining room. 4. Cocktail lounge. 5. Lounge. 6. Lounge.

Dex-O-Tex Magnabond Crossfield Products Corp.'s Dex-O-Tex products are used as bonding agents under deck planking, swimming pool tiling, and elsewhere. They are also to be found on topside wood decks where they are almost wear-proof and slide-proof.


1


2


3


4


5


6

HIGH PRESSURE AND HIGH TEMPERATURE STEAM IN NAVAL AND MERCHANT VESSELS

Part I

NAVAL VESSELS

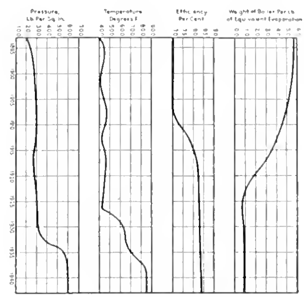
Note: This article is in two parts. Part II, dealing with Merchant Vessels, will appear in the February Pacific Marine Review.

All front line combat ships and most auxiliary ships in the Navy at the present time are driven by turbines powered by steam generated in watertube boilers. Oil is the fuel used to generate the steam. The problem that confronts designers in this respect is to extract every possible iota of energy from the oil, and to transform this energy into the maximum possible driving force at the propeller, using boilers and propulsion machinery that are as light-weight and compact as possible, and that are of rugged, absolutely reliable construction.

There has thus been a constant search on the part of marine engineers for boilers that could reliably produce increasing amounts of steam while burning the minimum practical amount of fuel. Similarly, engines have been under constant review to develop designs that could transform the energy in the steam into driving force at the propeller with an absolute minimum of losses. At the same time, in order to obtain utmost speed and cruising radius, and in order to be able to install the greatest possible amount of armor and armament, there has been a steady demand for reduction in the weight and in the space occupied by boilers and engines.

Engineers have known for a great many years that, other things being equal, power plants using steam at higher pressures and temperatures can transform fuel into driving power more efficiently than can plants using steam at lower pressures and temperatures. For example, at a steam pressure of 300 psi and at a temperature of 500° F, approximately 40% more fuel would be required per shaft horsepower than would be required when using steam at 600 psi and 850° F, and 60% more than for steam at 1200 psi and 900° F (Fig. 3).

However, the use of higher steam pressures and temperatures involved extensive complications, particularly with regard to strength of materials and design and construction techniques Natural likes and dislikes of men who had worked for years with lower pressures and temperatures also had to be overcome. The change to higher pressures and temperatures was thus a very gradual development (Fig. 1). The efforts to increase efficiently and decrease weight were first limited to those improvements made possible by changes in types and designs of engines and boilers and in the types of fuels. When the benefits derived from these changes began to approach their limitations, and as materials and techniques were improved, the change to higher pressures and temperatures was accelerated. The curves of Fig. 1 show this quite graphically with respect to watertube boilers. From 1895 to 1925 pressures and temperatures increased very slowly, but boiler weights decreased and



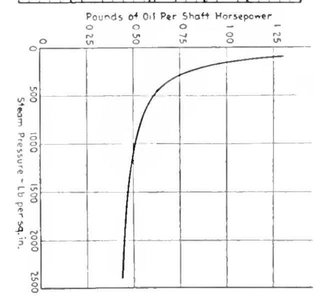


Fig. 1: Watertube boilers in naval service: full power operation. (Graph is from a paper "Development of Marine Watertube Boilers" by J. H. King and R. S. Cox, presented before the Society of Naval Architects and Marine Engineers.

Fig. 3: Curve showing general trend of pounds of oil required for all purposes to develop a shaft horsepower when using steam at various pressures and correspondingly appropriate temperatures.

efficiencies increased remarkably because of changes in types and design and because of the use of oil instead of coal. After 1925 temperatures started to shoot upwards, and pressures followed along in the 1930's. This called for new advances in boiler design because, as can be seen from the curves, boiler weights per pound of equivalent evaporation* remained almost constant despite heavier materials required for higher pressures and temperatures, and despite the fact that economizers were added to obtain still higher efficiencies.

Prior to 1900 all but a few of the vessels in the Navy were equipped with reciprocating engines and coal-burning Scotch boilers. Basically, Scotch boilers consist of one or more cylindrical furnaces surrounded by water. This water envelope is traversed by numerous tubes through which pass the gases from the furnace. The heat picked up by the water from these tubes and from the furnaces transforms it into steam. Because of the necessity of using relatively heavy shell plates with suitably stayed flat heads, Scotch boilers are heavy and inflexible, and are seldom built for operating pressures in excess of 250 psi. Scotch boilers, with water, weigh in the neighborhood of 70 pounds per square foot of boiler heating surface. Because of their inflexible construction and relatively poor circulating characteristics, it is not usual to "force" boilers of this type. At normal loads, approximately 10 to 15 pounds of boiler are required for each pound of equivalent evaporation per hour. Trials in the early 1890's on various Naval warships fitted with Scotch boilers showed coal consumption of 2.4 to 3.15 lbs. per indicated horsepower**

Because of the limitations of Scotch boilers, active steps were taken at the turn of the century to explore the possibilities of watertube boilers. Watertube boilers consist, essentially, of a furnace in which the fuel is burned, and a series of inclined tubes *across* which the gases pass, transforming the water *inside* the tubes into steam. The steam is collected in a drum before being sent to the superheater or prime mover. Because the water in this design of boiler is contained inside the tubes breaking it down into small segments, which improves heat transfer, and because circulation is more rapid, steam can be generated far more quickly than in a Scotch boiler.

The change from Scotch to watertube boilers was not effected without considerably controversy, and the discussions both in America and abroad were lengthy, involved, and heated. But the demands for lighter and more efficient boilers were insistent, and after much experimentation, watertube boilers became standard equipment for the Navy. The first Babcock & Wilcox boilers in the Navy were of the Sectional-Header type and were installed in the *Marietta, Annapolis,* and *Chicago* in 1896. The reliability of these boilers was an important factor which influenced the decision to adopt watertube boilers as a standard in the U. S. Navy. During the Spanish American War, the *Oregon*, equipped with Scotch boilers, and the *Marietta*, equipped with B & W boilers, took part in the great dash from the Pacific around South America to the East Coast. Commenting on their performance, Rear Admiral George W. Melville, who more than any other man was responsible for the adoption of the watertube boiler in the U. S. Navy, stated:

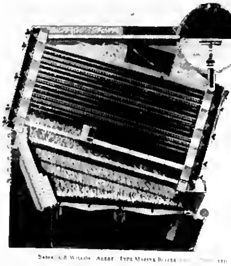


Fig. 4: Babcock & Wilcox "alert" type marine boiler, 1899 —patented.

"The Marietta's trip around South America at the beginning of the war with Spain was quite as successful as that of the Oregon. . . . No repairs were required to either set of boilers after the completion of the trip."

In 1897 William D. Hoxie, then vice president of the Babcock & Wilcox Company, patented the boiler that later became widely known and widely used throughout the navies and merchant marines of the world. Similar to the design used in the *Marietta,* it incorporated, among other advancements, the new feature of firing the boiler under the downtake headers, which greatly improved combustion and simplified operation. Although apparently simple, this invention was hailed as revolutionizing marine watertube boiler practice (Fig. 4).

Interesting installations of B & W boilers of this design were in the battleships *Michigan* and *South Carolina,* boilers for which were ordered in 1907. These were the first vessels in the Navy to be originally built with superheaters applied to the boilers. The working pressure was 295 psi and the superheaters were designed to give a total steam temperature of approximately 520° F. It was estimated that the use of superheated steam resulted in an overall saving of approximately 9% in coal consumption from that which would have been expected with saturated steam. The coal consumed was 1.46 lbs. per indicated horsepower—a substantial reduction from the average consumption for Scotch boilers in the preceding decade. Improvements in engine design deserve, of course, equal credit with the boilers for effecting this saving in fuel.

Boilers of this design weighed approximately 26 lbs. per square foot of boiler heating surface, including water. Superheaters added slightly more than 2 lbs. per square foot, making a total weight of about 28 lbs. per square

---

*Note 1. "Equivalent Evaporation" is a term used to provide a common basis for comparison of boilers operating under different pressures, temperatures, and feedwater conditions. For example, a boiler generating one pound of saturated steam per square foot at 250 psi from feedwater at 300° F, is doing much less work, other things being equal, than a boiler generating one pound of saturated steam per square foot at 450 psi from feedwater at 200° F. To place these "actual evaporations" on a comparable basis, the amount of heat required to change one pound of water at 212° F to dry steam at 212°F, both under atmospheric pressure, is used as the common denominator. This amount of heat is 970.3 BTU. Thus, for the first example above, the actual BTU's required would be 932.1 per pound. Dividing by 970.3, we have .96 pounds of equivalent evaporation. For the second example, the actual BTU's required would be 1036.6 per pound. Dividing by 970.3, we have 1.07 pounds of equivalent evaporation. The comparison between .96 and 1.07 is thus a true measure of the relative work being done by each boiler per square foot.

**Note 2. "Indicated" horsepower is the power of an engine as calculated from curves drawn on indicator cards attached to the engine when it is in operation. "Shaft" horsepower is customarily taken as being about 90% of indicated horsepower. This distinction is important when making comparisons with turbine installations, where the power is always measured directly on the shaft and is thus termed "shaft" horsepower

foot of boiler surface—or less than half the weight of a typical Scotch boiler. Also, it required approximately 5 pounds of boiler per pound of equivalent evaporation, as compared to 10 to 15 pounds per pound of equivalent evaporation for a Scotch boiler.

Watertube boilers played an important role in the development of destroyers during the decade 1900-1910 when the use of destroyers grew in importance in all the navies of the world. One naval authority has stated. "The most striking trends in design of destroyers were toward greater displacement, higher speed, heavier guns, and greater seaworthiness, habitability, and endurance. The success of this type of ship depended to a great degree upon the adequacy of its power plant. The results achieved would have been impossible without the use of water-tube boilers." One of the types of water-tube boilers that found wide acceptance in the Navy was the White-Forster design as built by the B&W Co. The first boilers of this design used in the Navy were ordered for the destroyers *Mayrant* and *Warrington* in 1909. The wet weight was approximately 12 pounds per square foot of boiler surface. This exceedingly light weight contributed materially to successful destroyer design. Because of space limitations, and limited design techniques superheaters were not used with this type of boiler.

In general, these were the two designs that continued in use throughout World War I—B&W Sectional-Header boilers, usually with topside superheaters, for larger combat ships, and B&W-built White-Forster boilers for destroyers. Despite the general adoption of turbines, there was a relatively slow increase in working pressures and temperatures.

The development of turbines to replace reciprocating engines was parallel to the change from Scotch to watertube boilers, and was equally important. The use of turbines came about for primarily the same reasons as the adoption of watertube boilers: Saving in space and weight, increased economy, lower first cost, reduced cost of maintenance, etc. Turbines also made it possible to use smaller shafts and propellers, and they reduced vibration considerably. However, these advantages were not always immediately forthcoming, and a similar controversy raged over turbines versus reciprocating engines as took place over water tube boilers versus Scotch boilers. A different problem which had to be overcame in the use of turbines was that of efficiently transferring power to the propeller. This called for the development, among other things, of efficient reduction gearing. Also performance of reciprocating engines continued to advance, and turbine performance had to keep abreast of it, at the same time that the "kinks" in turbine design and application were being ironed out.

One characteristic that delayed the adoption of turbines for larger vessels such as battleships was their relative inefficiency at low cruising speeds. This was of particular importance to the Navy, whose ships had to cover areas of the Atlantic and Pacific, with refueling bases few and far between. Fuel economy at low cruising speeds was thus of paramount importance, and many of the large battleships built just prior to World War I were equipped with reciprocating engines. However, turbine designers succeeded in overcoming these difficulties, primarily by the use of separate cruising turbines and effective reduction gears. Comparative tests were run on three battleships—the *Oklahoma* with reciprocating engines and the *Nevada* and *Pennsylvania* with turbines of different makes. The successful performance of the turbines in these latter two ships marked the passing of the reciprocating engine in combat ship propulsion.

Along with the adoption of watertube boilers and turbines came the use of oil rather than coal as the original source of power. The discovery of large oil reserves in the United States at the turn of the century led the Navy to study comparative advantages of oil and coal. Fuel oil was definitely adopted for destroyers in 1908, and the previously mentioned *Mayrant* and *Warrington* were built with oil-burning equipment. In 1912 oil was selected as the fuel for the battleships *Oklahoma* and *Nevada,* and subsequently became standard for all steam-propelled Naval vessels. The major advantages of oil over coal, which led to its general use were:

1. Increased efficiency, steadier performance of boilers, better regulation of steam supply, and faster starting up.
2. Decreased maintenance of boiler and hull. Greater cleanliness.
3. Decrease in fuel weight for a given cruising radius and decrease of bunkering space. Liquid fuel could also be stored in spaces previously wasted.
4. Fewer men required for operation, less manual labor involved.
5. Ease and simplicity of refueling.

The cumulative results of all these advances in design and in the type of fuel was demonstrated by the performance of the large battleships laid down during, and completed shortly after World War I. As an average, the fuel rate for these battleships was slightly less than one pound of oil per shaft horsepower, as contrasted with the previously mentioned fuel rates of 2.4 to 3.15 pounds of coal per indicated horsepower* for the naval vessels of the 1890's equipped with Scotch boilers and reciprocating engines. This significant reduction in fuel consumption was a major factor in permitting the construction of bigger, heavier armed warships, which could travel at greater speeds over longer distances than could earlier vessels.

The period following World War I saw the signing of the Washington Naval Limitations Treaty, which placed severe restrictions on naval construction. The number and total tonnage of capital ships for each country was definitely specified. New capital ship construction was limited to replacements, with each ship not exceeding 35,000 tons maximum displacement, except for aircraft carriers which were limited to 27,000 tons each. A capital ship was defined as any ship of war, not an aircraft carrier, whose displacement exceeded 10,000 tons, or which carried a gun with a caliber exceeding 8 inches. Lighter ships were not limited in number.

Commander H. E. Rossell, (C.C.) U. S. N. (Ret.) has aptly summarized the effect of this treaty on design practice: "The limit of 10,000 tons set by the Washington Treaty on the size of warships other than capital ships and aircraft carriers had a profound influence on

*See Note 2.

warship design practice. Designers were faced with the problem of getting the "most ship" on a given displacement. Obviously the solution lay in achieving the greatest economy of weight without loss of military effectiveness. All means to this end were explored and many found expression in the designs of cruisers which appeared within a few years after the treaty became effective.

"The innovations were progressive in nature; that is, one step led to another and still another. In time many of the changes introduced first on cruisers were extended to other types of warships. On the whole the result was to improve greatly the quality of warships, both small and large. . . . Among the immediate consequences of the Washington Treaty on the design of naval machinery was the general recognition of geared turbines together with small-tube oil-fired boilers as the most suitable type of propulsive machinery for all surface warships except motorboats and other very small vessels. . . . Other consequences of the treaty were the introduction of light weight alloys . . . the gradual substitution of weldments for castings or riveted structures . . . and the use of greater care in the design of machinery and fittings with a view to reducing weight.

"The use of high steam pressure and high superheat in conformity with practice in power plants ashore in the early 1920's offered to naval designers the possibility of making substantial reductions in the weight of the propulsive plant. . . . Today (1943) a boiler pressure of 600 pounds per square inch and superheat up to 850 degrees F are not uncommon on naval ships. The use of high pressure and temperature brought many problems, the most serious of which had to do with the behavior of metals at high temperatures, and deaeration of feedwater, the prevention of contamination of feedwater, the strength of high-pressure piping, the fire hazard, and the insulation of exposed surfaces at high temperatures.

"During the period under discussion there has been a strong trend toward great size of boilers with the result that a modern warship carries far fewer boilers than a ship of the same power built twenty-five years ago. The performance of naval boilers has been improved substantially during the last twenty years through better design of practically every feature. At the same time there has been a reduction in weight per unit of heat delivered. This end has been reached partly by increased efficiency of boilers and partly by greater consumption of fuel per unit area of heating surface."

The paper "Development of Marine Watertube Boilers" by J. H. King and R. S. Cox gives graphic and detailed proof of the general statements made by Commander Rossell with respect to the effect of the Washington Treaty on boiler design.

The first of the so-called treaty cruisers, laid down in the United States in accordance with the terms of the Washington Treaty were those of the *Salt Lake City* class of 9100 tons displacement which were completed in 1929. These ships required the lightest possible boilers and machinery consistent with ruggedness and reliability in order to provide for armament and other features within the treaty limits. The boilers of the preceding *Trenton* class, completed in 1924, had been considered light and efficient and they occupied relatively small

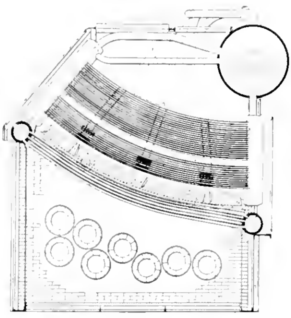


Fig. 5: Babcock & Wilcox sectional express boiler.

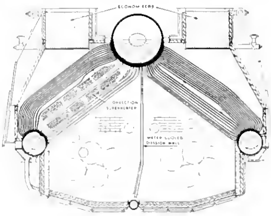


Fig. 6: Babcock & Wilcox divided furnace superheater-control boiler.

space. The *Trenton* boilers with water at steaming level and temperature weighed 11.84 pounds per square foot of heating surface. There were 12 boilers in each ship, with a total heating surface of 98,040 square feet, and the steam generated per ship at full power was 810,000 pounds per hour at 265 psi. The *Salt Lake City* had eight Babcock & Wilcox Express Type boilers with a total heating surface of 95,040 square feet and designed to generate at full power a total of 1,400,000 pounds of saturated steam at 300 psi. The wet weight was 10.37 pounds per square foot of heating surface, and the space occupied was considerably less than that of the boilers in the *Trenton* class. These boilers at a higher pressure, generated more steam with less weight and space than those in the *Trenton*, and thereby contributed materially to the success of these treaty cruisers. These *Salt Lake City* boilers weighed less than .66 pounds for each pound of steam generated on the basis of equivalent evaporation which may be compared to the 10 to 15 pounds per pound of steam required by the old Scotch boilers, or the 5 pounds per pound of steam required by earlier designs of watertube boilers.

The trend to higher pressures and temperatures brought about several important developments in the early 1930's, many of which were first introduced with the B&W boilers installed in the treaty cruisers of the *New Orleans* class. Because of the limitations imposed by the materials and techniques prevailing at that time, boiler efficiency dropped off with increases in pressure. To overcome this difficulty, a new design of boiler was sought. This investigation culminated in the B&W Sectional-Express boilers (Fig. 5). This design incorporated some of the features of the usual sectional-header boiler, but differed from this design in that cylindrical headers

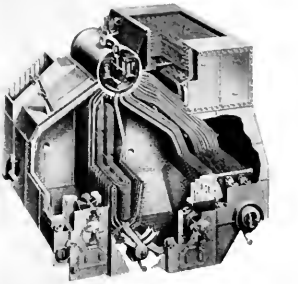


Fig. 7. Babcock & Wilcox single-uptake controlled-superheat boiler.

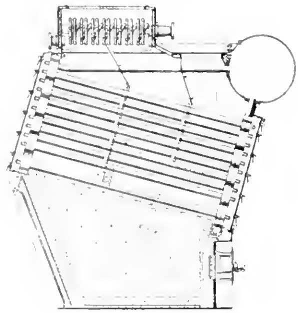


Fig. 8. Babcock & Wilcox three-pass sectional-header boiler

were used with small diameter curved tubes between the headers. The cylindrical headers were arranged so as to provide a decreasing gas area through the boiler, resulting in a uniformly high rate of heat transfer. Boilers of this design met the requirements of high steam pressures and temperatures and gave a high boiler efficiency.

The Sectional-Express boilers installed in the Scout Cruisers of the *New Orleans* class were designed for a working pressure of 300 psi and a total temperature of 570° F. On official full power tests they developed an efficiency of 82.12 per cent under the firing rate then customary in naval practice—namely, 1.1 pounds of oil per square foot of heating surface. This boiler was relatively light weight and at that time was considered a great improvement for naval use.

The boilers in the *New Orleans* class cruisers embodied one additional advance of great significance: fusion welded drums. All previous boilers had used riveted drums which were heavy, subject to leaks and cracking, and imposed severe limits on thickness. The Babcock & Wilcox Company therefore conducted an extensive series of investigations and experiments with fusion welding which resulted in a highly successful process giving lightweight, trouble-free drums, and thus opened the way to higher steam pressures without prohibitive increases in weight.

This initial installation of welded drums in the Navy was followed by their adoption for all naval boilers, and gradually for all of the United States merchant marine.

Great impetus was given to naval construction in the United States with the start of the naval building program in 1933. The destroyer leaders of the *Porter* class were among the first of this program. They were fitted with Babcock & Wilcox Express-Type Boilers designed for a working pressure of 425 psi and a total steam temperature of 650° F.

The use of higher temperatures in naval practice presented a problem in connection with the effect of high steam temperature on backing turbines and on main turbines and auxiliaries for maneuvering. Furthermore, with the usual convection type of superheater, the steam temperature increases with increase in the boiler firing rate. It was felt that, if some means could be provided to maintain a constant temperature at all ahead speeds of the ship and at the same time provide saturated or low-temperature steam for the backing turbines when going astern, increased economy could be obtained without detrimental effects on the machinery. The first solution was the B&W separately fired superheater. With this method of temperature control, steam is generated in Express-Type boilers and all steam to be superheated is passed to the separately fired superheaters, where the temperature of the steam is controlled by the firing rate. Some saturated steam is generated in the separately fired superheaters, since generating tubes were placed between the furnace and the superheaters in order that the convection-type superheaters could be fully screened from the radiant heat of the furnace. B&W boilers of this design were installed in the cruisers *Savannah, Boise, Phoenix* and *Nashville*, and the aircraft carriers *Yorktown* and *Enterprise* and several years later in the first *Hornet*. The first economizers in the Navy were also installed in these vessels. These boilers were designed for a drum working pressure of 450 psi and the separately fired superheaters were designed for a total temperature of 650°F.

A new era in boiler design opened with the development of the B&W boilers for the destroyers of the *Somers* class in 1934. Designed for a working pressure of 600 psi and a total steam temperature of 850°F, the boilers installed in these ships were significant in that they incorporated an integral superheater control which, in a single unit and with much lighter weight, provided the features of superheater control previously obtained with separately fired superheaters. These boilers were the Babcock & Wilcox Divided-Furnace Superheater-Control design fitted with convection-type superheaters (Fig. 6).

This boiler was a modification of the three-drum express-type boiler. The furnace was divided by means of a stud-tube division wall which provided two furnaces, one of which is referred to as a "superheater furnace" and the other as a "saturated furnace." Superheaters of the convection type were placed in one bank and were screened from the radiant heat of the furnace by several rows of boiler generating tubes. The other bank consisted entirely of generating tubes. With this design, saturated or superheated steam could be obtained as required. When saturated steam without superheating was needed, the saturated furnace was fired. When superheated steam was needed, the saturated steam was passed to the superheater and the degree of superheating imparted was con-

(Please turn to page 130)

WITH THE NAVAL ARCHITECTS AND MARINE ENGINEERS

THE 55TH ANNUAL MEETING of the Society of Naval Architects and Marine Engineers at New York, November 13th and 14th, brought out nine technical papers by some of the big marine experts.

Most outstanding feature in the make-up of the program is the dearth of marine engineering material. Only one paper in the nine deals with propulsion. The nearest approach to engineering among the other eight papers is No. 4, which deals with Electronics on Shipboard. All of the others are concerned with hull construction and design.

We present herewith a short abstract of each paper:

No. 1 - The Resistance of Barges and Flotillas

By L. A. Baier, Chairman of the Department of Naval Architecture and Marine Engineering, and Director of the Naval Tank at the University of Michigan.

For over 36 years the Naval Tank at Michigan University has been testing barge forms, both singly and in flotillas, and producing new designs of barge hulls and attachments thereto. From time to time, reports of this work have appeared as papers at A.S.N.A. and M.E. meetings. These experiments began in 1911 under the famous Dr. H. C. Sadler. Dr. Baier's papers brings them up to date and arrives at these conclusions:

"For single barges, influence of rake variations on resistance is reflected as a whole by the change in the block or longitudinal coefficient, although minor factors such as bilge and rake edge radii and shape of rake profile must be considered. As speeds are increased, the single barge is lengthened, the ends turned in, large bilge radii are used and modeled rakes at each end are of benefit.

"In direct contrast, for flotilla purposes the barge unit should be designed for the maximum integration possible. All edge radii should be small to reduce wetted surface and avoid wedging apart of the units by drift wood. Where complete integration is impracticable, the interior ends should have shorter rakes. A recent development in the oil trade is the use of integrated barges in pairs with the after rake snubbed off and the forward rakes lengthened. Four of these units, arranged either two wide and two long or one wide and four long, provide terminal and trip flexibility accompanied by efficient propulsion. The best size for these units is about 240 feet by 50 feet, making a flotilla either 960 feet by 50 feet or 480 feet by 100 feet for lockage. When properly designed, the resistance of the wide flotilla is only slightly greater than that of the tandem arrangement. For general freight and multiple units the 175-foot by 26-foot or 195-foot by 35-foot barge with snubbed after rakes gives a convenient lock combination and approaches the efficiency of the full integrated flotilla.

"It is interesting to note that due to improvements in flotilla units, controlled fleet arrangements, installation of the Kort nozzle and use of supercharged Diesel power plants the cost per horsepower today of modern towboats for a given tonnage is lower than in the past."

No. 2 - Various Governing Bodies and the Effect of their Regulations on Shipping

Three authors combined to produce this survey: William B. Jupp, Mgr. Marine Construction and Repair Division, Socony Vacuum Oil Co.; George I. Sullivan, Supt. of Drafting, Quincy Yard, Bethlehem Steel Company; Wolcott E. Spofford, Technical Consultant, U. S. Maritime Commission.

They confine their treatment to U. S. National Governing Bodies. Any survey of world shipping will indicate that for the past 900 years "there has been a very definite relationship between governmental law and regulations, and the success or failure of any specific merchant marine." Successful marine powers have had laws whose obvious intent was, and is, to foster all phases of the Maritime industry. In recent years, the apparent effect of U. S. Maritime law has been to "protect everything but the economics of the industry."

So complicated is the governmental regulation of American shipping that it now takes: 12 different certificates for the documentation of a new ship on delivery; 9 separate papers to clear an American port; and from 5 to 10 other papers relating to cargo. The set-up is inefficient, uneconomical, and demoralizing to the industry. We have 23 standing committees of Congress

making conflicting laws that form the basis of our maritime policy, and 67 bureaus and agencies that make and execute the regulations applying the laws made by the 23 committees.

It is recommended that a Merchant Marine Advisory Committee should be formed of selected delegates from each of the Associations representing the maritime industry and that this committee act in an advisory capacity to all the government regulatory bodies. This M.M.A.C. would function similarly to the Tanker Industry Committee which has been quite successful in this type of work for over 15 years.

No. 3 - The Multiple-Skeg Stern of Ships

By Captain Harold E. Saunders, U. S. N. Director of David W. Taylor Model Basin at Carderock.

Another of those monumental technical papers by Captain Saunders, wherein he traces the historical development of the twin or multiple skeg stern in Europe and in the United States; recites the reasons for interest in skeg sterns; analyzes the technical benefits derived from skegs; gives examples and analyses of tests on identical design models with and without skegs; gives an analysis of detail hull design in connection with twin skegs; and formulates design rules covering hull shape and stern arrangement, tunnel shape, skeg shape, skeg ending, propeller, rudder, shafting, bearings, foundations, and skeg structural details. We reproduce herewith two tables, one showing comparison between skegless and twin skeg designs for a very large tanker, the other, a similar comparison for the passenger liners *Manhattan* and *Washington.*

COMPARATIVE CHARACTERISTICS OF TWO LARGE TWIN-SCREW TANKER DESIGNS TESTED FOR THE SUN SHIPBUILDING & DRY DOCK COMPANY

All lengths and distances are in feet and inches. Lengths for coefficient purposes are lengths between perpendiculars. All tons are 2240 pounds.

TMB Model Numbers	TMB Model 3817	TMB Model 3821
Type of stern	Normal form	Twin skegs
Length between perpendiculars	685-0	685-0
Length overall	712-0	712-0
Length on waterline	700-0	699-10
Beam, molded	150-0	150-0
Draft, molded	32-0	32-0
Displacement, molded, tons	67,700	67,700
Block coefficient	0 705	0 705
Longitudinal coefficient	0 715	0.715
Midship section coefficient	0 986	0 986
Longitudinal *CB* forward of amidships	3.8	3.67
Wetted surface, sq ft.	117,118	120,778
L/B ratio	4 67	4 67
B/H ratio	4 69	4 69
Displacement-length ratio	198	198
Speed range, knots	8 to 18	8 to 18
Designed speed, knots	16	16
Speed-length ratio at designed speed	0 612	0 612
EHP at designed speed	12,380	12,850
SHP at designed speed	19,280	18,680
EHP/SHP ratio	0 642	0 687
Length of model, ft.	20-0	20-0
Scale ratio	34.25	34 25
TMB propeller model numbers	2462,3	2462,3
Propeller diameter	19 50	19.50
pitch	15.00	15.00
pitch-diameter ratio	0.769	0 769
number of blades	4	4
mean width ratio	0.247	0.247
blade thickness fraction	0 057	0 057
projected area ratio	0 450	0.450
type of blade section	airfoil	airfoil
direction of rotation	outward	outward

COMPARATIVE CHARACTERISTICS OF TWO TWIN-SCREW PASSENGER SHIP DESIGNS

All lengths and distances are in feet and inches. Lengths for coefficient purposes are length on the waterline. All tons are 2240 pounds.

Prototype Ships	*Manhattan* and *Washington*	None
TMB Model Numbers	TMB Model 3041	TMB Model 3898
Type of stern	Normal form, with balanced rudder and deadwood cut away	Twin skegs with twin vertical rudders
Length between perpendiculars, ft and in	666-0	685-0
Length overall	705-0	705-0
Length on waterline	685-0	684-10
Beam, molded, maximum	86-0	86-0
Beam, molded, at 29-ft. WL	85-5	85-5
Draft, molded, designed	30-0	30-0
Draft, for model tests	29-0	29-0
Displacement at 29-0 ft draft, tons	31,250	31,250
Block coefficient	0.645	0 645
Longitudinal coefficient	0 660	0 660
Midship section coefficient	0 977	0.977
Longitudinal *CB* forward of amidships	2 13	3 94
Wetted surface, sq. ft	74,148	76,505
L/B ratio	8 02	8 02
B/H ratio, based on 29-0 ft. draft	2.95	2 95
Displacement-length ratio	97.2	97 2
Designed speed, knots	20.5	20.5
Speed-length ratio at designed speed	0.783	0 783
EHP at designed speed	16,530	16,300
SHP at designed speed	24,620	22,400
EHP/SHP ratio	0.67	0 733
Thrust deduction factor	0.171	0 083
Length of model, ft	20 00	20.00
Scale ratio	34 25	34 25
TMB Propeller model numbers	1161, 2	1161, 2
Propeller, diameter	19-0	19-0
pitch	20-0	20-0
pitch-diameter ratio	1 052	1 052
number of blades	4	4
mean width ratio	0.227	0.227
blade thickness fraction	0 053	0.053
projected area ratio	0.383	0 383
type of blade section	Ogival, with lifted leading edge at root	Ogival, with lifted leading edge at root
direction of rotation	outward	outward

No. 4 - Electronics on Shipboard

By H. Franklin Harvey, Jr. and Frederick P. Colman, respectively Electrical Engineer and Assistant Electrical Engineer, Newport News Shipbuilding and Dry Dock Company.

Approaching the subject from the viewpoint of the shipowner and the shipbuilder, this paper briefly describes all present applications of electronics on shipboard, and discusses probable future applications. It defines electronics as dealing with "the conduction of electricity through a vacuum or a gas."

Earliest application was radio telegraphy in 1896. This was followed by: radio telephones; radio direction finders; radar; loran; shoran; life boat announcing systems; music and entertainment systems; fire detective alarms; temperature recorders; electric megaphone; electric eye door control; fluorescent lighting.

Principal future use visualized by the authors is in rectification of alternating current for such uses as: battery charging; energizing holding magnets for self-closing fire-doors; motors for operating watertight doors; direct current cargo winch motors. The authors believe such power rectification would show a decided space— and weight-saving over motor-generators.

Other possible applications are voltage regulators for electric generators, leveling devices for elevators, electrotherapy in ships' hospitals, sterilization of air in food storage or hospital spaces, electro-static precipitation of

dust or smoke, and inter-office communication.

It is suggested that electronics may furnish the key to direct utilization of atomic energy in ship propulsion.

No. 5 - Some Factors in the Use of Plastic Ship-Bottom Paints by the Navy

By Daniel P. Graham, Chemist, Research and Standards Branch, Navy Department, Washington, D. C.

Several commercial brands of plastic paint have been investigated by the Navy during the past 50 years. Outstanding in the early tests were the Moravian paints manufactured by Veneziani of Trieste. A green anti-fouling paint furnished by this firm passed Navy tests so satisfactorily that in 1902 several battleships and cruisers were coated with it. These applications proved very satisfactory, but because of pressure against use of foreign paints and difficulties in procurement, their use was discontinued.

In 1909, the Navy started making paints on its own formula, and purchase of commercial brands was stopped except in emergencies. In 1921, an investigation of the fouling of ships bottoms led to an appraisal of all toxic substances, and the Chemical Warfare Service was called into consultation. Under the guidance of Chemical Warfare Service, the Navy began the manufacture of hot application plastic paints. In 1924 and 1927, five destroyers were coated with these plastic compositions, but all were failures due to lack of adherence. The paint dropped off in large sheets or blistered very badly.

Mare Island Navy Yard was asked to carry on further investigations, and in 1931 reported that "all Chemical Warfare Service paints were quite effective against fouling and furnished good protective films." In 1932, the Navy bought sufficient Moravian paint to coat twice the bottoms of one destroyer and two cruisers, and after exhaustive tests, the experts agreed that Moravian was more effective than Navy Standard against fouling. The Navy then started out to find a formula that would be equal to or better than Moravian.

Mare Island Yard, Norfolk yard, and Edgewood Arsenal all developed and manufactured paints. These paints were used in comparison with each other and with Moravian in large-scale tests on destroyers. Eighteen months of these tests demonstrated a decided advantage for the Mare Island hot plastic paint, and the Navy's anti-fouling paint development program emphasized this paint. However, the need for a paint with less exacting application requirements led to the development of plastic paints for cold application.

Navy standard designations are: 15 H.P. for hot plastic; 105 and 143 for cold plastic anti-fouling used on surface vessels; 145 for cold plastic for submarines; 146 for cold plastic boot topping.

It is necessary to prepare a clean metal surface for the application of these paints and the Navy has standardized on a process of wet sandblasting to remove everything down to the clean steel, followed by a wash of 2% solution of phosphoric acid to prevent immediate surface corrosion. This method gives a better surface much more economically than hand chipping, power scaling, or power wire brushing.

For application of hot plastic, the Navy has developed a system of melting kettles, electrically heated pressure kettles, electrically heated pressure hose, and electrically heated spray guns. A film approximately 1/32" thick is sprayed on corresponding to approximately 2 pounds of paint per square yard.

Cold plastic when agitated is liquid enough for spray application at ordinary atmospheric temperatures. The best spray temperature for this paint is 70° F. After drying, its film melting point is 200° F.

This paper, after an exhaustive statistical analysis concludes that: (1) Fouling with these paints is negligible (only 10% of the vessels were fouled more than 5%). Fouling was reported as often on intact anti-fouling film as on spots where A. F. film was missing, which indicates that activity of vessel has much effect on fouling; (2) 15 H.P. has better adhesive qualities on hand-brushed steel surfaces than the cold plastic paints, but on sandblasted surfaces, the adhesive qualities are equal; (3) anti-corrosive properties of the Navy standard paints are equal.

Aside from cost of application, the one disadvantage of plastic paints mentioned in the paper is the greater initial skin resistance, as compared with the thinner, smoother commercial A. F. paints. This disadvantage may be greatly increased if the plastic paint is applied without strict compliance with the standard technique worked out in the Navy.

No. 6 - Mechanical Reduction Gears

By J. A. Davies and H. W. Semar, respectively Manager, Marine Turbine Engineering, and Superintendent, Quality Control Steam Division, Westinghouse Electric Corporation.

During World War II, the manufacturers of mechanical gears for ship propulsion machinery worked around the clock to supply the demand.

Reduction gears between turbine and propeller shaft were first introduced about 40 years ago. Their purpose is to allow the turbine rotor to run faster, thereby providing a more economical use of steam, and to allow the propeller shaft to run slower, thereby providing a more efficient propeller. Single reduction was used at first, but double reduction gearing was quickly developed.

Much research has led to: development of better machinery for cutting and finishing gear teeth; the use of harder and stronger steels in the forgings; the conviction that higher stresses can be safely used in gear teeth and in bearings.

The involute form of tooth is at the moment the most generally used tooth contour. The simple characteristics of its engagement and the relative ease with which it can be produced indicate that it is likely to be used for marine gearing for many years to come.

One of the principal problems still encountered with

this type of gearing is what is known as "pitting". Little circular pieces of steel break loose from the surfaces of the engaging teeth and leave behind small crater-like depressions. While pitting has not been known to interfere with the continued use of the gear, it is a problem to which much attention is being paid. Recent tests seem to prove that the amount of pitting is directly proportional to the relative roughness of the tooth surface. In other words, by providing a smoother finish to the flanks of the teeth, pitting can be reduced almost to the vanishing point. This lends support to the theory that pitting ocurs as a result of heavily concentrated loads on the prominences which are present on the flanks of gear teeth when a finishing operation, such as "shaving" or "lapping" has not been provided after the gears have been formed in a regular tooth cutting machine.

The paper gives a detailed description of the method adopted to determine the contact stresses which are encountered in gearing of this type.

No. 7 - Propeller Tunnel Notes

By Prof. Frank M. Lewis, Massachusetts Institute of Technology.

This paper discusses technical details involved in the cavitation testing of propellers in the M.I.T. propeller testing tunnel, and presents the cavitating test results for a series of wide blade propellers suitable for various types of high speed vessels.

An entire caviration test usually is made at a single number of revolutions per minute, 1200 being a common figure for a 12-inch propeller. The propeller is held to this fixed number of revolutions per minute by a tuning fork control acting on the field of the generator which supplies the propeller motor.

The revolutions per minute can be determined at any time by a counter-clock arrangement, and the deviation from constancy is of the order of 1/1000 or less. A synchronism indicator shows the operator whether the fork and motor are in or out of step.

The pressure in the tunnel is held constant automatically by a water leg. A 3-inch pipe leads 35 feet downward from the test section of the tunnel. At its bottom a pipe is connected which can be swivelled in a vertical plane. The top of this swivelled pipe is open to the atmosphere. A small stream of water is fed to the system continually and spills out the open end of the swivelled pipe. The two high points of the tunnel where air tends to collect are connected to a vacuum pump through float valves which will pass air but not water. The tunnel thus operates completely filled with water and the pressure at the propeller axis is equal to atmospheric pressure minus the pressure of a column of water of a height equal to the distance from the open end of the swivel pipe to the propeller axis. The pressure is lowered by lowering the swivel pipe, and raised by raising it. While the range of pressures thus obtainable is limited, it covers the usual requirements for cavitation testing. With this control, changes of water speed will lead to deviations from constant pressure, which are rapidly corrected.

No. 8 - Aluminum Alloys in Ship Construction

By M. G. Forrest, Asst. Naval Architect, Gibbs & Cox, Inc.

Experience during the past 12 years indicates that corrosion resistance, physical properties, and fabrication of aluminum alloys as used extensively in secondary ship structures have now demonstrated the feasibility of designing and building ships made wholly of these metals.

It is now considered that suitable aluminum alloys offer greater resistance than steel to marine corrosion. It saves great weight for equivalent strength. Toral saving in weight of complete ship will approximate 38%.

For some time to come, aluminum ships will be all riveted. The deflection of an aluminum hull will be twice that of a steel hull under sea and cargo load stress. Tests are needed to determine what effect this will have on watertightness of riveted joints. Experience with riveted aluminum rank cars over eight years of service indicate minimum leakage under severe rail conditions. Preliminary tests indicate that aluminum has less notch-sensitivity than steel.

In a normal cargo vessel of medium size, the vertical center of gravity of the aluminum ship will be 6 inches lower than that of the steel ship in light ship condition.

All aluminum structural material when received in the stockyard, should be thoroughly cleaned, treated with a water solution of phosphoric acid and grease solvents, then given a coat of zinc chromate primer. During fabrication, all faying surfaces should be coated with zinc chromate primer. The use of lead pigment primers on aluminum causes corrosion after immersion in salt water. Anti-fouling paints may be applied only over zinc chromate primer. Connections of aluminum to steels, to nickel alloys, or to copper alloys should be avoided, or the faying surfaces of these dissimilar metals be electroplated with cadmium. The new Argon-gas tungsten-arc welding process shows great promise of making satisfactory strength joints in aluminum. Tests under way seem to indicate that this method may produce satisfactory ship joints.

Aluminum in machinery must be limited to applications not subject to temperatures above 400° F. In pipe valves and fittings, temperatures not over 200° F. and pressures not above 50 p. s. i.

Present conditions in the aluminum industry justify entire vessels of this metal up to about 450 feet in length.

No. 9 - Design of Modern Ships

By George C. Sharp, Naval Architect.

The purpose of this paper is to try to dissipate some of the "inertia of tradition" which causes so much trouble to designers of modern ships, and to provoke

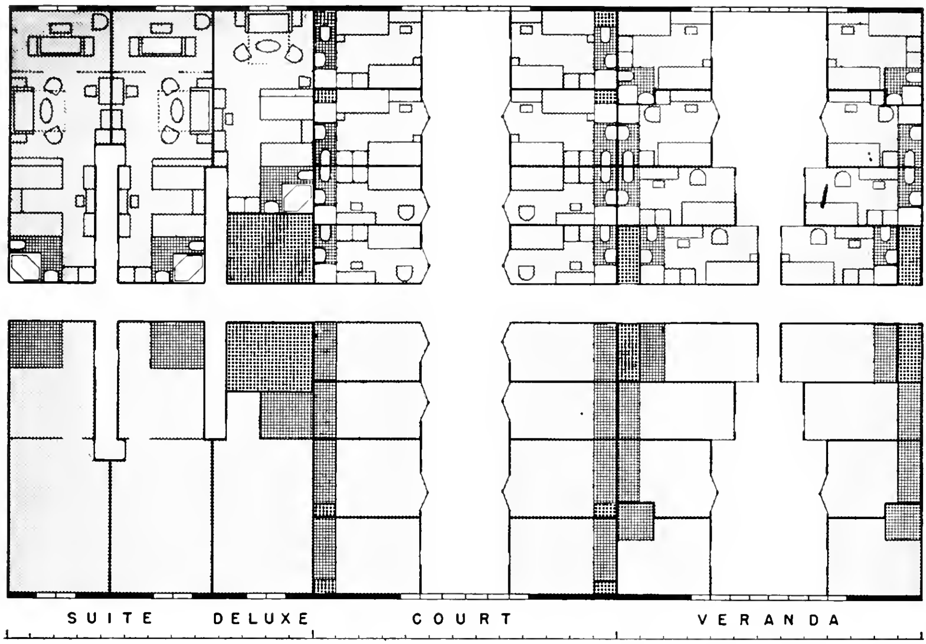


Fig. 1. Application of Air-Light Arrangements.

LEGEND

discussion with that end in view. (Probably no one person in these United States is more qualified by experience and by temperament to accomplish these purposes—Ed.)

Passenger accommodation arrangement is the first factor discussed. We are always striving to get outside rooms by, in effect, bringing some part of the room to the outside skin of the ship. Why not try, in effect, bringing the outside skin to the room? Proposed arrangements to effect this are shown in Fig. 1. The author calls these Air-Light arrangements. They involve large windows in the ship's side and either a stepped vestibule to the central passage or a wide court running right across the ship. Rooms opening from each side of these light-air ways are fitted with windows so that each room has a view of the sea. Table I gives an idea of the value of this arrangement as applied to a European passenger vessel built in the 1930s.

In machinery arrangement, the paper makes a strong plea to take advantage of the increasing compactness and decreasing weight of modern power plants by giving serious consideration to single screw installations for vessels of large power. Small cross-section up-takes are advocated, with entire separation from the stack or stacks which can then be proportioned for the best streamline effect, or can be eliminated. The external up-take for modern forced draft boilers need be little larger than a king post, and can be made to serve as such.

Air conditioning presents serious problems. The compactness of passenger accommodation spaces makes the installation of air conditioning ducts a very "complex business". Insulation temperature control and drainage are very important. On a medium passenger liner at sea, the system may remove 10-15 tons of water per day by dehumidification of the air. Consideration should be given to these matters in the design stage of the hull and the air conditioning experts consulted.

The author (Chairman of a Safety of Life at Sea subcommittee, assigned to develop proposals on fire prevention for a new International Convention) visualizes considerable modification of the rules, particularly in the matter of heat transmission through bulkheads. He feels that a "review of existing requirements would indicate the possibility of considerable simplification of the rules."

He concludes: "In the final analysis, I feel that if we give the necessary attention to arranging our accommodations to provide a maximum of air and light to all rooms; if we provide them with conditioned air, where

(Please turn to page 132)

HEAVY-DUTY CHAIN DRIVES FOR MARINE PROPULSION SERVICE

By N. C. BREMER,
Chief Engineer, Morse Chain Company
Subsidiary of Borg-Warner Corporation

During the war, because of the shortage of helical-gear and electric drives for smaller diesel-powered ships, transmission chain, which had had a long record of successful application in industry, was adopted for marine service. In 1942, after the Navy Department Bureau of Ships had conducted a series of tests on chain drive, it was fitted on 65-ft. and 110-ft· harbor tugs, and the Army Transportation Corps FP cargo vessels. This paper points out the advantages as well as the limitations of chain transmission applied to ship propulsion and mentions factors which contribute to efficiency, long life, quietness and low maintenance costs.

Introduction

TRANSMISSION chain has been successfully used on diesel-powered equipment for many years. The latitude in design permitted by its accommodation to varying centers and its ability to carry heavy loads under adverse conditions of protection, lubrication and alignment, has made it a popular drive medium on many types of mobile or portable equipment where saving in space or weight is important.

When totally enclosed and properly lubricated, the chain drive is a long-lived piece of equipment. Histories of from 10 to 25 years of service can be exhibited for high-capacity drives in various industrial plants throughout the world.

While but a few marine-propeller drives of more than 100-hp capacity had been built up in 1942, the performances of several drives on small dual-engine commercial vessels encouraged the Navy's Bureau of Ships to make a thorough study of the possibilities of the chain drive as a substitute for electric and helical-gear drives which, at the time, were on the critical list as regards availability.

The study resulted in a decision to equip its YT 65-ft. tugs and a number of the YT 110-ft. harbor tugs with dual engines and to compound the power of these by chain drives to drive large slow-turning propellers.

The success of the drives in these boats and in the Army Transportation Corps' small FP cargo vessels has created considerable interest in this new marine transmission.

Function of Chain Drives

The primary function of chain drives in diesel-propelled vessels should be considered as that of compounding or transferring power from two or more engines to a single propeller shaft.

While chain drives are efficient speed reducers they will not commonly be adapted to the function of speed and torque change in a single-engine single-screw vessel, as in this case the gear drive would be indicated because of its inherent compactness.

As a matter of fact, the design possibilities of multiple-engine plants, especially when high-speed engines are to be used, are often enhanced by combining reduction gears with chain drives in the power train.

When used with medium-speed engines the speed reduction accomplished by the chain transmission in itself is usually sufficient to allow the use of large propellers. Reversal of the propeller can be through the use of separate reverse gears on each engine or in the output train, with specially designed reversing chain drives, or by the use of direct-reversing engines.

The suggested arrangements shown in Figs. 1 to 6 are but a few of the many combinations which are possible and which open new opportunities to the marine-power-plant designer wishing to utilize the advantages of multiple engines.

Characteristics of Chain Drives

Power-Capacity Ranges. It will be noted that many of the suggested power trains incorporate a combination reverse reduction gear between the engines and the chain drives. Preference is thus implied for drives designed for the lower revolutions-per-minute brackets which incorporate the heavy-duty series of manufacturers'

Prepared for presentation before National Meeting of the Oil and Gas Power Division, Milwaukee, of The American Society of Mechanical Engineers.

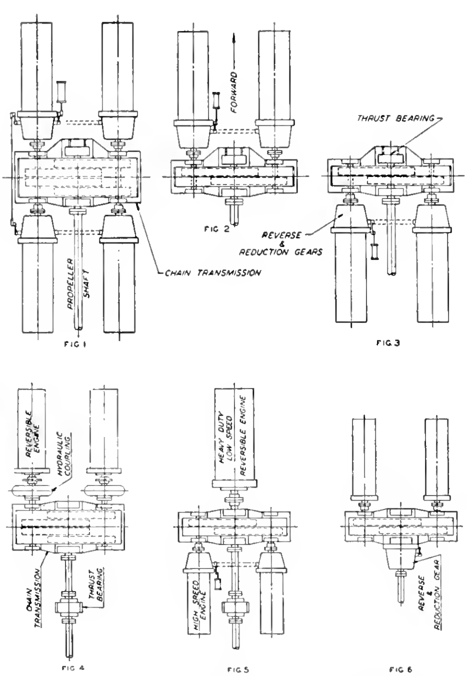


Fig. 1-6. Typical machinery arrangement for multiple-engine marine drives.

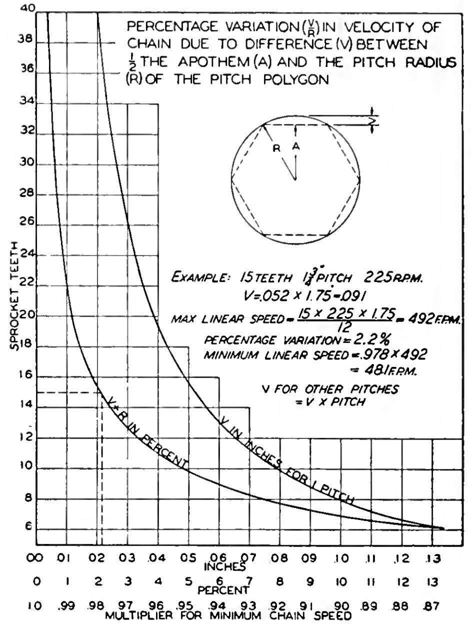


Fig. 7. Chordal-action chart.

standard steel-finished roller chain. This series covers ¾ to 2½ in. pitch chains usually made up to quadruple width as standard and 5 to 8 strands wide as special.

Reference to the capacity chart, Table 1, will show that capacity up to nearly 2000 hp per engine may be handled by a single transmission provided that input speed is sufficiently low.

Multiple-strand chains for marine drives should be constructed with the center plates shaved or bored to allow a heavy press fit on the pins.

While this type of roller-chain design requires special tools for assembly or disconnection, it provides a "pre-loaded" condition of the chain side bars which is most conducive to maximum load-carrying capacity.

In a theoretical sense the maximum power-carrying capacity of a chain drive is determined by the point at which excessive sprocket width causes dangerous bending deflections to occur in the shaft or sprocket because of chain pull. In this discussion, however, the conservative upper limit of horsepower capacity will be considered as that of two 6-strand chains sharing a common load on the same sprocket.

Speed Ranges. It must be emphasized that chain drives, unlike gears, have sharply defined upper limits of rotative speed for any given pitch. This limit is usually established by the ability of the chain roller to withstand the impact forces created by the chordal action of the chain as it engages the sprocket. Here again, the speed ratings given with this paper are conservative and assume all elements of the chain will have unlimited endurance capacity under continuous service conditions at full load.

While the linear speed of the chain is not a critical factor, good practice seems to dictate a range of from 2000 fpm to 3500 fpm, the smaller pitches of chain being better adapted to the higher speed.

Chordal Action. Figure 7 shows the effect of the sprocket polygon causing chordal rise and fall of the chain. It will be noted that small numbers of teeth in the sprockets create decided variations in the velocity of the chain. The practical effect of this is to create undue noise and to set up stresses in the chain which reduce materially its endurance capacity. As the number of teeth in the sprocket increase, this velocity change drops off markedly and the quietness, smoothness, and load-carrying ability of the drive increases.

The minimum desirable number of teeth for the small sprocket of marine chain drives, regardless of pitch, is in the range between 26 and 35.

The smallest sprocket in the marine drives illustrated in this paper contain 30 teeth. The result of the use of this relatively generous number of teeth probably contributes more than any other single factor to the success of the drives. The quietness of the transmissions at all

speeds is one of their outstanding characteristics.

Ratio Limitations. Ratios as high as 10 to 1 are often used in industrial drives. In these cases, however, either speeds or loads are sufficiently low to allow the use of very small sprockets.

The outside limit of reduction for marine drives should probably be about 5 to 1. Even this ratio, assuming that suitable pinion teeth are incorporated, would necessitate a large driven sprocket which is seldom possible because of limited hull clearance.

When very slow-turning propellers are to be used with high-speed engine, a good practice would be to choose a chain drive of about 3 to 1 ratio, using reduction gears or combination reduction-reverse gears between the chain-drive input shafts and the engine. Heavier, more rugged chains are used with this arrangement and a better balance of power train design is possible.

Factor of Safety. The load tables given in this paper are based upon a minimum working-load to chain-strength ratio of about 1 to 30. As this high factor is necessary only because of rapidly recurring dynamic loadings created by chordal action, it is obvious that the chain has an enormous capacity for resisting momentary shocks and overloads. The well-designed marine chain transmission can withstand the effects of "rough going" as well as any other unit of the propeller drive.

Elastic Properties of Chain. The elastic "stretch" of a roller chain due to application of the working load amounts to about 0.0006 in. per in. of its length. From this it is apparent that the natural period of the chain is quite high and little need be feared from torsional resonance with either the propeller shaft or the engines.

This relative lack of "rubber" in the chains makes it necessary that where two or more chains are used to share a common load, the chains must be carefully matched for pitch to insure proper distribution of chain pull.

It is also obvious that housing deflections of a nature which would create excessive parallel misalignment of the shafts must be avoided.

In this respect, however, the chain drive is considerably less sensitive than a reduction gear, and chain-drive housings may be of substantially lighter construction than gear cases. Installation problems are also simplified especially if self-aligning bearings are used.

Pitch Elongation—Chain and Sprocket Life. It is quite customary to set up the usual chain drive in such a manner that the "slack" caused by joint wear can be taken up.

This is sometimes accomplished by the use of adjustable idler sprockets, or more often by increasing the center distance between the sprockets with sliding motor bases or brackets.

However, the usual chain drive is not entirely protected from the effects of dust and moisture and seldom is supplied with a copious bath of oil.

Moreover, it has long been established that a roller chain installed and operated under good transmission conditions develops nearly all of its "stretch" or pitch elongation during the first few hundred hours of operation, and, once it has been "run-in," can be operated for thousands of hours without further elongation of any appreciable degree.

Repeated tests have proved conclusively that this tendency to stretch at the start due to the constriction at the ends of the holes in the chain bushings caused by the heavy press fit of the side bars which does not allow full utilization of the total bearing area of the chain joint.

Development of grinding and honing processes adapted to the larger sizes of chains has made it possible to assure full seating of the full length of the chain bushing bore at the very start. In addition, this also allows correction of inaccuracies of side-bar hole spacing and bushing-bore parallelism which would cause uneven loading.

For this reason the Navy drives were designed without any provision for pitch-wear take-up.

The chains were installed with an initial tension of about 25 per cent of the working load on both strands. Under this condition the chain drive has practically no backlash and no appreciable looseness developed after prolonged periods of operation. Moreover, the drives set up with this minimum amount of slack were quiet and smooth in operation from the very start. No "break-in" period is required for marine chain drives and full sustained loads may be applied immediately.

It will be noted that separate chains are used from each engine to the main sprocket. With this system maximum wrap is obtained without idlers, and the drive retains the desirable feature of ability to operate with one engine in case of accident to one of the chains.

Sprockets in marine chain transmissions have almost unlimited life. Steel of machinable hardness or high-strength cast iron is often used. As there is no rubbing action on the sprocket teeth, and as the driving forces are distributed over a relatively large number of teeth, very little sprocket wear occurs.

Efficiency. Chain drives for marine service are slightly more than 99 per cent efficient at full load. This high efficiency is due to the low velocities of the journal elements in the chain joint and the fact that with large numbers of teeth, impact losses are very low. In industrial drives the losses do not fall off in direct proportion to the load so that efficiency at say 1/4 load at full speed is but about 97.5 per cent. The latter condition of course cannot occur in fixed-blade propeller drives.

Chain-drive losses fall off rapidly at reduced speed, however; thus it may be stated that the marine chain

ENGINE RPM AT PEAK HP	HORSEPOWER PER ENGINE									
	CHAIN PITCH & NO	SINGLE	DOUBLE	TRIPLE	QUAD	QUINT.	SEXT	TWO QUAD	TWO QUIN	TWO SEXT
1175–1850	3/4-60H	19	38	57	76	95	114	152	190	228
950–1350	1-80H	31	62	93	124	155	186	248	316	372
650–1050	1 1/4-100H	49	98	147	196	245	294	392	490	388
500–800	1 1/2-120H	64	128	192	258	322	386	516	644	772
415–700	1 3/4-140H	85	170	255	340	425	510	680	850	1020
350–600	2-160H	105	210	315	420	525	630	840	1050	1260
260–460	2 1/2-200H	156	312	468	624	780	936	1284	1560	1872

TABLE BASED ON ENGINE SPROCKET HAVING 30 TEETH. RATIOS UP TO 4:1.

Table I. Main chain-drive ratings.

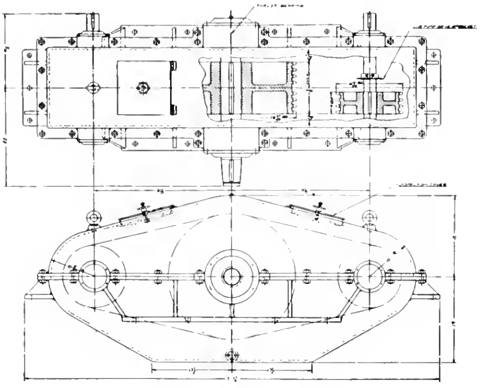


Fig 8. Typical heavy-duty chain drive.

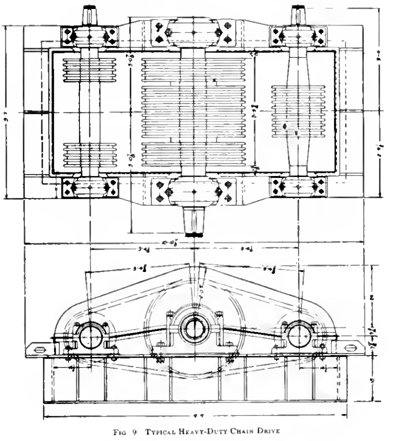


Fig 9 Typical Heavy-Duty Chain Drive

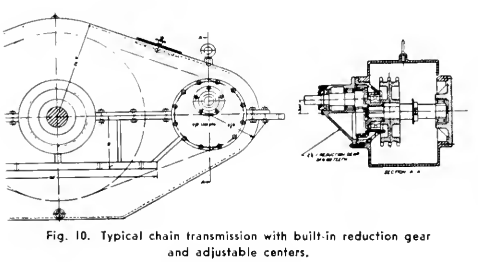


Fig. 10. Typical chain transmission with built-in reduction gear and adjustable centers.

drive is very nearly 99 per cent efficient over the entire speed range.

Lubrication. Chain drives are not critical as regards oil viscosity. Any medium oil which is fluid enough at all operating temperatures to reach the joint or "heart" of the chain is suitable. The type of oil used for the engine lube system seems to be ideal for the marine chain drive, and the use of engine lubricating oil in the chain housing has been the standard practice in nearly all installations.

The oil, however, should never be taken from the engine lube system. A separate sump, strainer, and pump should be provided for the chain transmission, preferably driven by a gear or chain from one of the pinion-sprocket shafts. Spray pipes should be placed to distribute the oil to all portions of the chain.

Cooling of oil is not always necessary. When chain speed is less than 2500 fpm, oil temperatures seldom exceed 130 F.

Types of Housings. The drives illustrated were constructed at a time when horizontal-boring-mill facilities in the country were critically needed for work on helical gear reducers and other large machinery. For this reason the transmissions were designed to utilize standard pillow blocks with self-aligning roller bearings. The bases were weldments of 1-in. plate well ribbed to assure stability. The sheet-steel tops were functional only as enclosures.

This arrangement worked out very well and can be recommended as lending itself to economical manufacture especially where the drives must be custom-built singly or in small lots.

Standardized units may be constructed along the lines shown in Figs. 8 to 10, inclusive.

Thrust bearings of either the roller or slipper type may be incorporated into the transmission. The axial movement of the propeller shaft resulting with the use of the Kingsbury-type bearing is easily accommodated with the chain drive because of the generous clearances between the sprocket faces and the chain side bars.

Reverse Gears. On the Transportation Corps FP vessels a reversible chain drive has been used. In this transmission an arrangement of pneumatic clutches allows the propeller shaft to be engaged either with the main forward chains or with a pair of reverse chains which, through the use of idlers and a follower sprocket, causes reverse rotation of one clutch element. In these transmissions the forward drives were on fixed centers and reduction was provided in both forward and reverse speed.

In these ships four engines were used with two separate chain-driving twin propellers.

In the largest series of the Navy tugs direct-reversible engines were used. Speed reduction by the chain drive was 3 to 1.

Gear-type disconnect clutches allowed operation with either or both engines. Also, on some of these tugs this arrangement made possible the transfer of the power of the starboard engine from the propeller to a high-pressure fire pump.

The smaller boats used unidirectional engines with combination reverse and 2 to 1 reduction gears between the engines and the chain drive. The control of the reverse gears was by mechanical linkage to a common pneumatic cylinder which in turn was operated by re-

more control from the pilot house.

The simultaneous control of two reverse gears has been accomplished on other vessels with hydraulic, electrical, and mechanical linkage in each case with excellent operating characteristics.

Equalization of Engine Output. Inasmuch as the engines are locked in rotational step, it is easy to expect that there might be some trouble in keeping the engines in good power balance, especially on craft like tugs where frequent starting, stopping, and speed change are necessary. However, most of the troubles which had been anticipated did not materialize.

Pilot house adjustment of speed has been successful with both pneumatic- and hydraulic-throttle-control systems. Once the usual preliminary adjustments have been made, the two engines remain in good torque relationship over the entire speed range. Occasionally the exhaust temperatures are checked and slight adjustments of the governors may be made by the operator.

At no condition of operation has there been noticed a tendency of one engine to "fight" or oppose the other. During trial runs purposeful unbalancing of the engines seems to result in nothing other than a dropping off in speed of the system.

Hydraulic Couplings. Chain drives undoubtedly respond to the smoothing-out action of hydraulic or magnetic couplings fully as much as would a gear drive under the same conditions.

As pointed out previously, the chain is not to any degree elastic nor does it possess damping ability; consequently, abnormal engine cyclic variations or vibrations must be met either by increasing the size of the chain or by introducing an absorbing device between the engine and the drive.

The hydraulic couplings on the larger of the Navy tugs functioned chiefly to permit of easy starting and to allow better synchronization of engine output. Their contribution to the success of the chain drive is not too well established as engine-output characteristics were good.

The hydraulic couplings used on these tugs were of the traction type, with the outer and heavier elements supported by the chain-drive bearings.

Scoop-type hydraulic couplings or excited magnetic couplings may be used, making it possible easily to disengage one of the engines for light operating conditions or in an emergency.

Whether or not a reaction-type coupling is used, it is advisable to incorporate a flexible coupling between the engine and the load.

A coupling which allows of easy disconnection is recommended when other means are not available to disengage one of the engines.

Advantages of Chain Drives

The advantages of the single large slow-turning propeller are best utilized on workboats such as tugs, where

(Please turn to page 132)

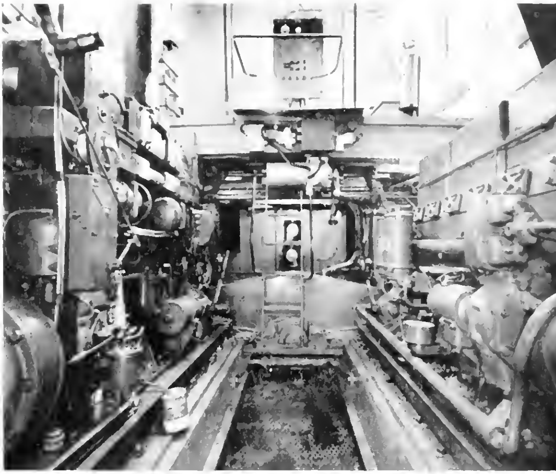
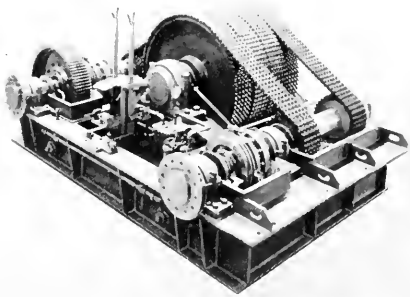
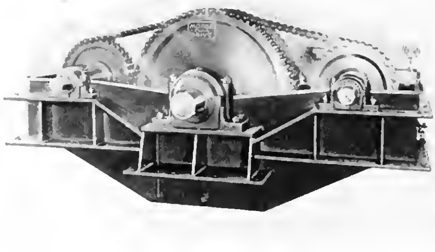


Fig. 11. Typical engine installation with chain transmission to single propeller shaft.



Dual engine 3 to 1 propeller drive with disconnect clutches and emergency fire pump drive.



Heavy duty chain drive for dual engine vessels—2 to 1 ratio.

DEVELOPMENT OF SHIP FORMS

By WILLIAM A. BAKER, Assistant to Naval Architect,

Bethlehem Steel Company's San Francisco Yard.

Part II

Foundations for Modern Practice

Among the more important searchers for the "form of least resistance" and one who helped lay part of the foundation for our present knowledge of ship resistance was John Scott Russell. He was greatly interested in the subject of waves formed by ships and started experiments in 1833; in all, the tests numbered nearly 20,000 including both tests of models in tanks and full sized vessels in canals. The first mention of his so-called "wave-line" theory came in 1834 in a paper on the "Mechanism of Waves" before the British Association for the Advancement of Science.

He found through his experiments that ship resistance was the sum of three things—wave making, midship area and surface friction. While appreciating the effect of surface friction he fell back on the accepted practice of using the midsection area as a measure of resistance. In addition, he believed that the waterlines of a ship should be shaped according to his theory for minimum wave making—those in the fore body should be a curve of versed sines while those in the after body had a trochoidal form. The details of this theory were fully given in a paper read before the Institution of Naval Architects in 1861 and in his monumental "The Modern System of Naval Architecture" published in 1864.

Russell's wave-line theory was followed by a number of designers, one outstanding example being Brunel's *Great Eastern* in which the entrance was 330 feet, and the run 220 feet. The dimensions of that ship built in 1859 are:

Length between perpendiculars	680'0"
Breadth of hull	82'6"
Depth to Upper Deck	58'2"
Load draft	30'0"
Displacement at 30 ft. draft	27,000 tons
Horsepower of screw engines	1600
Horsepower of paddle engines	1000
Horsepower, total	2600
Speed	15 knots

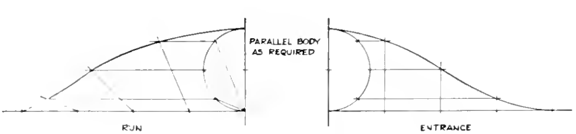
Contrasting Russell's theory basing the hull form on waterlines and a buttock, Lord Robert Montague in 1853 published a method of design and practical drafting based on what he termed "dividing lines", a form of diagonals. Later, a Norwegian naval architect and shipbuilder, Colin Archer, concluded that Russell's wave-lines did not represent the actual path of water around a ship's hull—that the path was nearer that of Montague's "dividing lines"—and proposed in a paper in 1887 that the sectional area curve to the load waterline follow the proportions of Russell's curves.

Among the curiosa of the period are two papers, one in 1854 and the other in 1887, concerning the relation between the forms of fish and ships. Plaster casts of various fish were made and areas measured at transverse sections from which a sectional area curve was plotted.

All modern work on ship resistance is based on the experiments begun by William Froude and continued after his death in 1879 by his son, R. E. Froude. William Froude's many friends in the naval and shipbuilding fields interested him in some of the theoretical problems offered by naval architecture. His early work, beginning about 1856, was on the rolling of ships; later he turned to resistance experiments. Some of the first resistance experiments were performed on a river using small self-propelled models for which he constructed clockwork mechanisms. Later he tried further tests using a tank in which the models were towed by the accepted method of a falling weight; these tests proved unsatisfactory.

The most important of William Froude's early resistance experiments were made in the autumn of 1867 with three different sized models towed by a launch in the mouth of the River Dart in Devonshire. The following is abstracted from a report of the British Association for the Advancement of Science in 1869:

"In verification and illustration of the foregoing views, I tried in the autumn 1867, a large number of resistance experiments on a pair of models of contrasted forms, 6 ft. long, by towing them simultaneously from the ends of a pair of 10 ft. scale-beams connected with self-recording



RUSSELL'S WAVE LINE

dynamometric apparatus, and mounted on booms projecting sideways from the nose of a steam-launch . . . One was of the wave-line type, the other, having the same length, form of midship-section, and displacement had large rounding ends. I also tried similar experiments with a pair of very nearly similar models of twice the dimensions and eight times the displacement. I had also previously obtained a series of experimental results of the same kind, but with less successful apparatus, from a similar pair of models, 3 ft. long. These data enabled me to compile for each model a diagram of resistance in terms of velocity."

The general agreement of the results were sufficient to justify what he termed the Law of Comparison which is the foundation of all model test data; it is stated in Froude's words as follows:

"If the ship be D times the 'dimension' (as it is termed) of the model, and if at the speeds V_1, V_2, V_3 . . . the measured resistance of the model are R_1, R_2, R_3 . . . then for speeds $\sqrt{D}\,V_1$, $\sqrt{D}\,V_2$, $\sqrt{D}\,V_3$ of the ship, the resistance will be D^3R_1, D^3R_2, D^3R_3 . . . To the speeds of model and ship thus related it is convenient to apply the term 'corresponding speeds'."

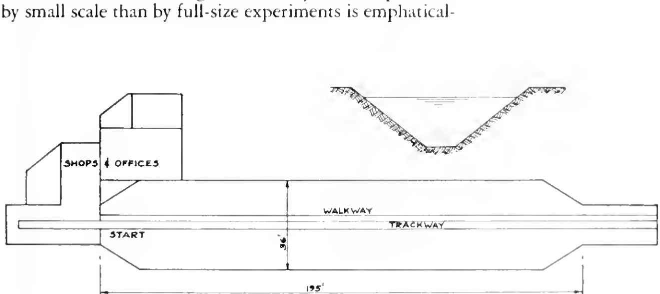
In 1852 M. Reech published "Cours de Mecanique" for use of the students of L'Ecole d'Application due Genie Maritime which contained a law of comparison for the resistance of floating bodies based on Newton's theorem on "Similarity of Motions". He also mentioned that the law of comparison could be applied to the comparison of models and ships, but held only when frictional resistance followed the same general law as the other forces. In addition, he surmised that the frictional resistance probably varied as the square of the speed. As far as is known, Reech did no experimental work to substantiate his complete statement of the law of comparison. William Froude worked out his statement of the law on the basis of the streamline theory of resistance without any knowledge of M. Reech's theory.

The British Association report concluded:—"It is true that the circumstances under which my experiments were tried did not admit of such exactness as to render them absolutely conclusive as the sole basis of the theory of comparative resistance in terms of dimension. Nor do I by any means pretend to be certain that there is no element of resistance other than I have taken account of in my theoretical justification of it. But if any such do exist, they can be detected and the laws of their operation discovered with far greater facility and completeness by small scale than by full-size experiments is emphatically disproved, it is useless to spend vast sums of money upon full-size trials, which, after all, may be misdirected, unless the ground is thoroughly cleared beforehand by an exhaustive investigation on small scale."

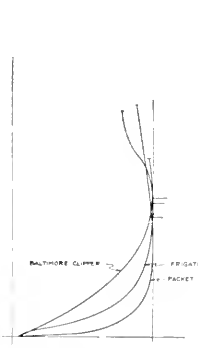
In 1868, at the instance of Mr. E. J. Reed, William Froude forwarded to the Admiralty, at first proposals, and later detailed estimates for the construction and operation of a model testing tank. In 1870 the Admiralty finally allowed £2000 for the project with the stipulation that construction and testing were to be completed in two years; rolling experiments as well as those pertaining to resistance were to be undertaken. The tank was constructed in a field next to the garden of Froude's house and is referred to as the Torquay Tank; its length was 195 feet exclusive of starting and stopping positions, surface breadth 36 feet and maximum depth at center 10 feet. The towing power was a two-cylinder stationary steam engine. Froude served as tank designer, superintendent and mechanic making much of the apparatus himself—he even constructed a machine for ruling cross-section paper as none of sufficient accuracy could be purchased. This machine was still in operation in 1941.

From his experiments with various sized models, Froude had noted that at corresponding speeds, similar forms had shown geometrically identical wave configurations. Curves of total resistance plotted against speed for the same models also showed similar shapes and could be brought into general alignment by the Law of Comparison but they could not be superposed. Froude believed that this failure to superpose was due to the fact that skin friction did not follow the Law of Comparison while wave-making resistance did. The first projects of the Torquay Tank were experiments to demonstrate that if the frictional resistance of surfaces having the same lengths and wetted surfaces as a series of similar ship forms and moving at the same speeds were deducted from the total resistances, the remaining resistances followed the Law of Comparison.

In August and September, 1871, Froude carried out the now famous experiments on the H. M. S. "Greyhound", a ship having a length of 172 feet 6 inches, breadth, 33 feet 2 inches and a draft of 13 feet 9 inches, was towed by H.M.S. "Active" from the end of a 45 foot boom rigged out from the latter's side so as to tow the "Greyhound" in undisturbed water. The purposes of the



FROUDE'S TORQUAY TANK



COMPARATIVE MIDSECTIONS

experiments were to:

1. Determine the total resistance of a full-sized ship at various speeds, unencumbered by the extra resistance caused by the action of the propeller and by the friction of the various parts of the ship's engines.
2. Determine the loss of power in the propeller and machinery.
3. Test the scale of comparison between ships and models.

In order to obtain the data to compute the loss in the propeller and machinery, the "Greyhound" and a sister ship, H.M.S. "Mutine" were run at two speeds over measured mile courses.

During the same period, the classic surface friction experiments were being performed. These consisted of towing a series of planks of varying lengths about 3/16 inch thick and 19 inches deep to determine the values of f and n in the following equation for a number of different surfaces:

Frictional Resistance=f S V^n

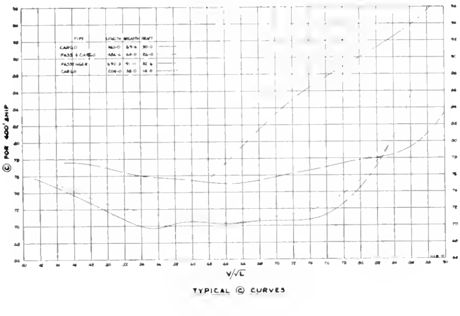
where V is in knots. The surfaces tested were varnish, paraffin, tinfoil, calico, fine sand, medium sand and coarse sand. As a whole the experiments showed:

"1. That n is less than 2 provided the surface is not too rough.
2. that for a given type of surface f decreases as length increases.
3. that at a given length the degree of surface roughness has a very important bearing on the magnitude of f."

The values determined by the experiments, slightly modified by R. E. Froude at a later date and smoothed out through years of use, were adopted for use by the International Congress of Model Basin Superintendents in 1935.

Based on extrapolated values from the above experiments Froude was able to bring the model and full-sized tests of the *Greyhound* into reasonable agreement. But in notes made at the time he states:

"There has always seemed reason to surmise that a sensible augmentation of the *Greyhound's* resistance might have arisen from the comparative shoalness of the water in which the trials were made, the depth averaging about nine fathoms, or about four times the draughts of the ship. . . . It has proved that the surmise is correct, and had thus not only incidentally shown that the excess



TYPICAL © CURVES

of the ship's resistance as compared with that calculated for the ship from the resistance of the model is very sensibly less than prima facie it had appeared to be, but also that the resistance of all large ships, tried for instance on the Stokes Bay measured mile, is, at full speed, more than 10 per cent in excess of its true value."

By placing a false bottom in the tank to simulate the actual trial course of the *Greyhound* it was shown that at 11¼ knots the increase in resistance was 4½ per cent. "It will be seen by a reference to the *Greyhound* Report that the application of such a correction to the curve of resistance calculated for the ship from the experiments with the model would considerably improve its agreement with the actual curve of resistance of the ship."

The above discussion on the effect of shallow water on resistance was reported to the Admiralty after the publication of the paper on the *Greyhound* experiments presented to the Institution of Naval Architects in 1874 and seems not to have been published until 1941.

The general success of the experiments gave confidence in Froude's methods and the Torquay Tank remained in use for fourteen years—until the lease on the land ran out. In 1887 the present Admiralty Establishment was opened at Haslar. In spite of Froude's success, the advantages of model testing took hold slowly so that by 1900 there were only five tanks in the world. At present there are more than fifty major tanks in the world and probably countless small ones.

Apart from the many experiments on hull forms, struts, propellers, etc. performed by the Froudes, father and son, one great contribution was the so-called "constant" system—a system of non-dimensional coefficients for noting the features of a ship—and allied with this their method of comparing sectional area curves, waterlines and midship sections.

R. E. Froude's paper before the Institution of Naval Architects in 1888 stated: ". . . it will doubtless be readily understood that the results obtained in the past with all miscellaneous models, form a storehouse of information valuable for the future; and further, that in order to serve this purpose the information must be so presented that the performances, and also the proportions (and, as far as may be, the principal characteristics of shape), of the several forms, may be directly comparable; so that it may be determined at sight (1) what selection of forms previously tried are qualified by their general proportions and shape to be brought into comparison with any new design, (2) how the individuals so qualified compare with each other in performance.

"The method which has been adopted with this object at the Admiralty Works is simple in principle, and may be simply described as follows: (1) The proportions, and to some extent the lines, of the hull, are characterized by numerical values and diagrams, representing not absolute measurements of hull, but measurements stated in terms of a unit dimension proportional to the cube root of the displacement. (2) The performance is characterized by two so-called 'constants', designated K and C, of which the former denotes speed in terms of a unit speed proportional to the sixth root of the displacement, while the latter denotes the corresponding resistance (or horsepowers(in the form of the reciprocal of what is known

(Please turn to page 138)

EDITOR'S NOTE: The Marshall Plan looms so large in the future of American shipping that the following analysis and summary of the statement of the U. S. Chamber of Commerce will be of interest to the entire industry. The summary was prepared by Stanley T. Olafson, Manager of World Trade Department of Los Angeles Chamber of Commerce.

PROPOSED EUROPEAN RECOVERY PLAN — THE MARSHALL PLAN —

I—Situation and our Interest

The urgency of the world situation is such that immediate decisive and constructive action to aid Europe must be taken by the Congress of the United States. The enlightened self-interest of the United States calls for a stable world composed of self-supporting and self-governing people.

II—Aim of Aid—Cooperation, not Charity

Aid to be extended must be aimed at the restoration in each of the sixteen recipient countries of an economy of sufficient health, in a favorable political climate, that will be self-energizing, through the initiative, hard work, and self-reliance of the people themselves.

Aid to be extended is based on the existence of a reasonably founded hope that all Europe needs is help from us to help itself back to self-support.

III—Responsibility

The restoration of production in Europe by EUROPEANS is a first esential to the successful outcome of any aid extended—under the system of private initiative.

IV—The Goal

When Europe's standard of living is raised to a satisfactorily self-supporting basis, then we can ultimately be relieved of the burden of extending aid.

V—Recommendations—To Accomplish Purposes and Objectives

That our aid should be divided into two classes:

A TYPE I—THE INTERIM AID PROGRAM

The first type of aid, not included in the European Recovery Program, is for immediate relief, by supplying foodstuffs, fuel, fertilizers, fibers, and medicines, for the destitute and suffering peoples of Western Europe during the interim before the long term European Recovery Program is inaugurated. It also includes aid for the purpose of increasing the production of foodstuffs and fuel.

Aid to be extended in this classification should be in the nature of sales payable in local currencies for such use of the United States may decide.

B CONTROL AND USES OF PROCEEDS RECEIVED IN LOCAL CURRENCIES

Local currency proceeds should be administered by the Board of Trustees to be set up in each recipient country. Final use decisions to be controlled by United States Domestic Corporation and should be made available for:

a. The purchase of needed materials for stockpiling by the Government of the United States.
b. Use within the country and its dependencies for self-energizing and productive enterprises.
c. Aid in the stabilization of local currencies.
d. Other uses as may be decided upon by agreement with country receiving the aid and the United States Domestic Corporation.

C TYPE II—THE EUROPEAN RECOVERY PROGRAM—AID BY LOANS

The second type of aid is exclusively for the economic improvement and recovery of participating European countries by increasing their production for domestic consumption and for export, thereby increasing their standard of living.

Aid to be extended under this classification is the European Recovery Program and is exclusively:

a. For specific purposes.
b. For attainment of specific results within definite time limits.
c. For non-political purposes of a direct or indirect nature.
d. For purchase of specific materials.

AND IS TO BE ON THE BASIS OF LOANS.

VI—Classifications of Loans

TYPE 1

By the Export-Import Bank for raw materials, to put into operation existent productive facilities.

Loans for raw materials for above-described purpose could be granted through the instrumentality of the present Export-Import Bank authority, expanded as may be necessary. Such dollar loans shall be for realistically adjudged, economically productive purposes and in the opinion of the Export-Import Bank be self-liquidating in dollars.

TYPE 2

By the World Bank for capital goods equipment, to reconstruct, maintain, repair, and operate productive facilities capable of economic contribution to the well-being of the country concerned. These are to be self-liquidating dollar loans.

(Please turn to page 136)

--With The

Fred Cordes

PACIFIC MARINE REVIEW IN PORT ENGINEERS SOCIETIES

At its January meeting, held January 7, the Society of Port Engineers at Los Angeles Harbor voted Pacific Marine Review full rights to attend business meetings and full photo and news coverage opportunities. Members of Pacific Marine Review staff are already members of other Port Engineer Societies on the Pacific Coast, and will regularly report all meetings, and continue to publish the technical proceedings. This latter feature has been commended in open meeting, and the members have widely praised it.

Port Engineer of the Month

LOS ANGELES

FRED CORDES OF DECONHIL

Fred H. Cordes, vice president and marine superintendent of Deconhil Shipping Company, and marine superintendent and assistant operating manager for Hillcone Steamship Company, was born in New York City in 1896 and came to San Francisco in 1915 where he secured employment at the old Union Iron Works, now Bethlehem Steel Corporation Ship Building Division, working in the shop, engineering drafting room and estimating department.

In 1919 he left the Union Iron Works to enter the Marine Department of the Standard Oil Company of California, remaining with this company until the latter part of 1927. While with Standard Oil of California, he worked in the Richmond Long Wharf machine shop and also as a draftsman and assistant inspector on new ship construction and repair work. He later quit shoreside work and went to sea as an oiler on Standard's vessels, staying with it until he received his unlimited Chief Engineer's license for steam and diesel ocean-going vessels.

The latter part of 1927 he resigned from the Standard Oil Company of California and, together with his brother, John, started the firm of Cordes Bros., Marine Surveyors and Manufacturer's Representative.

He opened the Southern California office of Cordes Bros. at Wilmington the latter part of 1930 and was made special representative for Hillcone Steamship Company February 1931. As Hillcone's various enterprises expanded, he devoted more and more time to their interests until he became marine superintendent and assistant operating manager, and in 1943 when Deconhil Shipping Company was formed, he was made vice president and marine superintendent.

Besides the above activities, he still represents the Sandusky Foundry and Machine Company of Sandusky, Ohio, and the Butterworth System, Incorporated, Bayonne, New Jersey for the Southern California area.

During World War II, Deconhil Shipping Company operated approximately sixty vessels as general agents and sub-agents for the War Shipping Administration, and the upkeep, maintenance and repairs of this large fleet were under Cordes' direction, besides being in charge of all company operations in the Southern California area.

He feels especially fortunate to have worked under such men as Al Gunn, Gene Essner, Charlie Olson, Lee Gogan and Frank McCormick while at the old Union Iron Works, and J. C. Rolfs, Charlie Robertson, Jim Cronin, Bob Bennison, William Muir, Herb Hoy and many other kind and helpful friends too numerous to mention, who were always ready to lend a helping hand when needed.

Port Engineers -

Ed Graff, Port Engineer of San Francisco

1948 OFFICERS FOR SAN FRANCISCO SOCIETY

Phil Thearle, Army Transport . . .	President
Charles Wright, Deconhil . .	Vice President
James Reimers	Secretary-Treasurer

New Governors

Frank Smith	American Mail
Vincent Foell	U. S. Lines
William Billings	Pope & Talbot

Port Engineer of The Month

SAN FRANCISCO

ED GRAFF OF GRACE LINES

Born and raised in San Francisco, Ed S. Graff, the smaller of the Graff boys was graduated from San Jose High and joined Panama Mail Line, then owned by Grace, as a junior engineer on the *Venezuela* in 1929. In 1938, he advanced to Chief, and served on the *Condor, Capac, Pacifico* and *Flying Cloud.* He brought the latter out from New York in 1939—one of the first steam C-2's.

Ed came ashore in 1941 to the position he now holds as Port Engineer under Marine Superintendent Ed Center, to which gentleman he attributes much of his engineering knowledge. That he is recognized as a leader in his profession is evidenced by his election to the Board of Governors of the Society of Port Engineers at San Francisco.

Ed has a son, John, aged 12, and a hobby of model-making in his shop which includes a complete machine shop.

Phil Thearle

Pacific World Trade

Reg. U. S. Pat. Off.

LELAND W. CUTLER SWORN IN AS MEMBER OF SAN FRANCISCO WORLD TRADE CENTER AUTHORITY

President of the World Trade Center, Incorporated since 1944, Leland W. Cutler was recently sworn in as a member of the San Francisco World Trade Center Authority by Superior Judge Albert C. Wollenberg. The ceremony took place in the Judge's Chambers at the Hall of Justice, Kearny and Washington Streets.

Present at the ceremony were Thomas A. Maloney, Assemblyman who led the San Francisco delegation in the battle for the establishment of the World Trade Center Authority, and Alexander von Hafften, Manager of the Legislative Department of the San Francisco Chamber of Commerce. Acting for the Chamber which sponsored the World Trade Center in 1944, von Hafften worked closely with Cutler and the San Francisco delegation during the recent sessions of the legislature.

Cutler was appointed to the authority by Governor Earl Warren early in December.

Judge Wollenberg, as an Assemblyman in the state legislature, took an active part in the fight to secure passage of the bill.

Leland W. Cutler

PACIFIC FAR EAST APPOINTS CHINESE ADVISER

PACIFIC FAR EAST LINE, INC., announces appointment of T. Y. Tang to the post of adviser on Chinese affairs. Mr. Tang previously had served as Chinese agent but the new post was created to meet rapidly growing economic developments in China which will require considerable traveling and consultation.

At the same time the Company named Frank W. Chinn as Chinese general agent in San Francisco. Mr. Chinn will open separate offices in Chinatown as soon as suitable space can be found, but meantime will work out of Company headquarter offices at 141 Battery Street. The new Chinese agent is well-known in foreign trade circles, having been connected with a number of leading San Francisco export houses for more than 18 years. He joined Pacific Far East Line several months ago.

WORLD TRADE CENTER APPOINTMENTS

Governor Earl Warren has appointed eight public members of the San Francisco World Trade Center Authority. Named by Governor Warren were: Leland W. Cutler, Vice President of the Fidelity & Deposit Company; Floyd M. Billingsley, Business Agent of the San Francisco Motion Picture Operators; J. A. Folger, Wholesale Tea and Coffee Dealer, all of San Francisco; Paul L. Davies, San Jose, President of the Food Machinery Corp.; L. K. Marshall, Lodi, President of the Wine Growers Guild; Prof. E. T. Grether, Dean of Business Administration, University of California, Berkeley; Charles Howard, Oakland, Howard Terminal Co., operator; and George Pollock, Sacramento contractor. Public Works Director, Chas. H. Purcell; Finance Director, James S. Dean, and the President of the San Francisco State Board of Harbor Commissioners are the remaining members of the 11 member Authority.

ADDRESS AT BANQUET ABOARD PRESIDENT CLEVELAND

By JOE MARIAS

I have a painting of a ship which I prize very highly. It is a small three-masted full rig ship named the *Minegue*, my father's last ship. I think that it was about 1100 tons burden. In my office I have a lovely picture of this ship, thanks to Mr. Killion.

Shortly after the first World War we had in this country, to say nothing of other countries, men who said that we were not a maritime nation and that we could neither build nor operate ships. And judging by the ridiculous statements attributed to some of our people in Congress and their actions, there are still some in this country. Perhaps if they were to go through this magnificent ship, they would be like the blind man who was led to an elephant, and felt its trunk and ivory tusks and then said, "There's no such animal". It seems to me that there are too many Americans who are still ignorantly isolationists. And when I think of isolationists, I wonder if some of them really think that they can be just a little bit isolationistic. It's like others of a misguided group who think they can be a little pink.

I have no time for these borderline cases. If anyone wants a better illustration of the horrible results of isolationism than China, I do not know where he will find it. Without being critical of a condition for which present-day Chinese are not responsible, let me remind you that in old China a great wall was built around the country so that it would be isolated from the rest of the world. And inside the Great Wall, smaller walls and moats were built to isolate cities from one another. And, inside those walls were the compound walls behind which families isolated themselves from other families similarly walled in. Many of us who have lived in China have actually lived within compound walls. Now then, while there was communication between families, there was practically none between cities. And furthermore, China wanted no communication with nations living beyond the walls. But history tells us how nations on the outside mounted walls and took over. The dynasties of China were really hardly more than outside conquerors going over the walls. Everything that history has taught us about isolationism proves that the isolationist is vulnerable and has always been licked. Thank God that those responsible for this splendid vessel have over-ruled such short-sightedness, but what about the future?

And to those like ourselves here, what are we going to do about it, What are we doing to force our Government to accept a very progressive merchant marine policy? And, while I'm asking questions, what are we doing to guarantee that this vessel and all other vessels of our flag be assured of our unwavering support? God grant that we not enter another war. But two wars—across the seas—certainly should tell us that we simply have no alternative but to be sure, very sure, that this and all other American ships support themselves. Immediately this gives rise to that other subject of operations—subsidies. I do not like subsidies; first because that means a taxpayer contribution and we have enough taxes to pay as it is. Second, subsidies also mean more government control and I don't like to see Washington pencil-pushers push us around. But when you get right down to it, you cannot expect the man who pays the bills to simply let the other fellow run the show. We went through the subsidies fakery for a number of years.

One time when President Harding sent for me, he asked me to remain in Washington to assist him in put-

(Please turn to page 136)

Mexico Further Adjusts Import Duties

Mexico has raised import duty rates on all items of Schedule 1 of the U. S.-Mexican Trade Agreement to the level of 1942 ad valorem equivalents by decree published December 15 effective 5 days therafter. Goods actually enroute to Mexico on December 15 will be admitted at old rates. Action was taken provisionally pending revision of Schedule 1 to be undertaken immediately at the close of the Havana ITO Conference. The usual public announcement of opportunity for hearings is to be made at the appropriate time. The United States has consented to this provisional action in recognition of Mexican trade in balance and also the need for more reasonable protection. Mexican duty rates on the items affected have been at a specific rate per unit of quantity, which with increasing prices has resulted in declining revenue and protection.

A schedule of the new rates is available at the Department of Commerce Field Offices.

World Trade Week

With "World Trade Makes Good Neighbors" as the theme, the 14th annual nationwide observance of World Trade Week will take place May 16-22.

Pacific WORLD TRADE

Left to right: T. R. Stetson, Pacific Coast Borax Co.; Mrs. T. R. Stetson; Ray Cole; Toni Urias, California Import Export; Carl Martin, Pacific Far East Line; Josephine Macias; Art Banuelos, International Expediters, Inc.; Jack Wallace, Pacific Far East Line; Inc.; Mrs. Jack Wallace; Mrs. Roy M. Billings; Roy M. Billings, California-Asia Co., Ltd.; Mrs. John D. LaMontague; John D. LaMontague, Pacific Far East Line, Inc.; Mrs. Harry G. Regan; Harry G. Regan, Pacific Far East Line; Inc.

Left to right: Sally Carlino, Otis, McAllister & Co.; Mrs. Philip T. Wadsworth; Philip T. Wadsworth, Otis McAllister & Co.; W. H. St. John, American President Lines; Robert E. Lynds, American President Lines; Mrs. Robert E. Lynds; Mrs. Homer E. Rathbun; Homer E. Rathbun, American President Lines.

JUNIOR FOREIGN TRADE ASSOCIATION OF SOUTHERN CALIFORNIA

The Sixth Annual Banquet of the Junior Foreign Trade Association of Southern California was held on December 5 in Los Angeles, and had a very fine turnout. The banquet was a success in every sense of the word. Dr. Bernard F. Haley presented an exceptional address, while Ruth Anne Fleming, as Miss Junior Foreign Trade, brightened the head table with her presence and highlighted the occasion with her singing.

The program opened with a salute to the flag, and the assembly was led in song by Miss Fleming, followed by the introduction of speaker's table. There were four delightful songs by Miss Fleming and a history of the Junior Foreign Trade Association. Paul Pauley, toastmaster, introduced the speaker, Dr. Bernard F. Haley, head of the Department of Economics of Stanford University, and Special Consultant to the U. S. Department of State in Washington. Dr. Haley was much in attendance at the Geneva Trade Conference last October, and is now attending the Havana Conference.

Brae Loveless, of Pacific Far East Lines, and president of the association, presided at the banquet. The program committee consisted of: George Gmelch, Transmarine Navigation Co., who was chairman; Paul E. Pauley, U. S. Department of Commerce, toastmaster; Doug Friman, Lloyd Shipping Company; James Loudon, Jr., Loudon & Company; Walter Rabenston, Sudden & Christenson; Robert Ryan, General Steamship; Robert Ruth, J. B. Ruth & Company; Max Linder, Transmarine Navigation Co.; and George Rowley, Fireman's Fund Insurance Company.

Highlights of Dr. Haley's talk, entitled "International Negotiations as to Trade Barriers" are given herewith: "The present effort of the United States with respect to international trade policy is directed to the achievement of two principal aims: (1) the restoration of the conduct of international trade, as far as possible, to private traders; and (2) the reduction of the multitude of barriers to international trade that have developed in the period between the wars and since World War II. One of the instruments which the United States has consistently used to obtain a reduction of trade barriers has been the Trade Agreements program, based on legislation first enacted in 1934.—Consequently, the United States early took the lead in urging upon other countries: (1) the necessity

At the Speaker's Table, left to right: Florence Wright; Paul E. Pauley, Department of Commerce; Mrs. Brae Loveless; Ruth Anne Fleming; Dr. Bernard F. Haley, Speaker; Brae Loveless, Pacific Far East Line, Inc.; Mr. Measday, U. S. Dept. of Commerce.

for a broad, united effort for the reduction of restrictions on trade and the elimination of discriminatory practices in trade; and (2) the disirability of establishing an International Trade Organization. Negotiations for both of these have been in process between the United States and sixteen other nations for two years. These negotiations have recently culminated in the announcement of a multilateral agreement signed by twenty-three countries at Geneva on October 30, 1947, for the mutual reduction of trade barriers and trade controls of all kinds.

". . . The multilateral agreement . . . covers tariffs, preferences, quotas, internal controls, customs regulations, state trading and subsidies. It is undoubtedly the most comprehensive international instrument ever negotiated with respect to trade barriers, quantitative restrictions, and discriminatory practices affecting international trade.

". . . The Agreement also comprehends general rules with respect to commercial practice in the conduct of trade, looking toward the elimination of trade discriminations, quantitative restrictions on trade, and the unfair use of subsidies in the promotion of exports.

"These same matters are covered in a similar way in the proposed Charter for the International Trade Organization which is under consideration by a much larger number of nations at the current International Conference on Trade and Employment at Havana. In addition, the Charter requires the participating nations to collaborate for the elimination of cartel practices that are restrictive of trade between countries.

"It must be stressed that this whole program is essentially a long-range program for the restoration of world trade. It cannot be expected to have very much effect in alleviating the seriousness of the immediate economic crisis in Europe. The process of breaking down the barriers to trade is likely to be somewhat slower than it otherwise would be, because of the fact that many countries need dollars so desperately that they must retain quantitative restrictions on their imports from this country in order to maintain economic stability."

Left to right: Mrs. Max Linder, Sr.; Max Linder, Sr., Transmarine Navigation Co.; Mrs. Wm. F. Diss; Wm. F. Diss, Transmarine Navigation Co.; Mrs. Max Linder, Jr.; Max Linder, Jr., Transmarine Navigation Co.; Robert O. Vernon, Lloyd Shipping Co.; Mrs. Doug Friman; Doug Friman, Lloyd Shipping Co.; Bill Walker, U. S. Motors.

Export Managers Elect Officers for 1948

At the annual meeting of the Export Managers' Association of San Francisco, the following officers were elected to serve during 1948:

President: Victor A. Indig, Export Manager, American Rubber Mfg. Co.; Vice President: A. E. Ojeda, Foreign Trade Consultant, Standard Oil Co. of California; Secretary: William D. Jorres, L. H. Butcher Co.; Treasurer: Roy Norton, Export Department, Shell Oil Co.

1300 Air Cargo Shipments with Latin America

A new all-time record for air express shipments to and from Latin America through the busy Miami, Florida, gateway was set by Pan American Airways during November. A total of 1,267,631 pounds of cargo—making up an average of more than 1,300 separate shipments a day—were flown in and out of the city aboard PAA Clippers.

The unprecedented tonnage was almost double the volume handled by PAA's Miami express office in November 1946, and was considerably more than the total for the entire year a decade ago.

At the Speaker's Table, left to right: Brae Loveless, Pacific Far East Line, Inc.; Ruth Anne Fleming, Miss Junior Foreign Trade; Mr. Measday, U. S. Dept. of Commerce; Mrs. Measday; Mrs. Stanley T. Olafson; Stanley T. Olafson, Los Angeles Chamber of Commerce; Mrs. George Gmelch; George Gmelch, Transmarine Navigation, Banquet Committee Chairman.

W. J. Gilstrap

WORLD TRADE OFFICERS

Election of W. J. Gilstrap, assistant vice president and manager of the Foreign Department, Wells Fargo Bank & Union Trust Company, as 1948 president of the World Trade Association of the San Francisco Chamber of Commerce, was announced recently by the Chamber.

The following officers were elected: First vice president, G. A. Gumbrecht, resident partner, Henry W. Peabody & Company of California; Second vice president, Ralph V. Dewey, export manager, Marsman Company of California; Third vice president, Victor B. Smith, export manager, Sperry Flour Company; Treasurer, W. L. Guthrie, assistant vice president, Bank of America, N. T. & S. A.; and secretary-manager, Alvin C. Eichholz, manager, World Trade Department, San Francisco Chamber of Commerce.

Newly-elected directors are: Victor L. Arenth, John E. Fields, W. L. Guthrie, Frank Howland, John J. Jacobs, T. R. Jamieson, W. I. Nelson, Victor B. Smith and Robert Taylor.

Re-elected directors are: Frank Cook, Ralph Dewey, Harry C. Dunlap, A. Gemperle, W. J. Gilstrap, G. A. Gumbrecht, R. H. Kahman, E. Russell Lutz, H. A. Magnuson, L. I. McKim, James C. Morrison, Daniel Polak, J. H. Rogers, Harry R. Sims and Richard S. Turner.

Ex-officio members are: Past President Fred B. Galbreath and John J. Judge.

Pacific World Trade

SHIPPING FIRMS LICENSED

The following shipping concerns are now licensed by SCAP to establish agencies in Japan:

American: Pacific Far East Lines, Inc.; American President Lines; U. S. Lines Co.

British: Butterfield & Swire (Japan) Ltd.; MacKinnon Mackenzie & Co. (China) Ltd.; Cornes & Co., Ltd.; Jardine Matheson & Co., Ltd.; Dodwell & Co., Ltd.

Philippine: C. F. Sharp & Co., Inc.; Everett Steamship Corp.

These companies are authorized to conclude contracts for carriage of freight, mail, and pasengers by water to and from Japanese ports and to maintain in Japan facilities for furnishing services and supplies necessary to these shipping operations. They may act as agents for other shipowners.

PACIFIC COAST FOREIGN TRADE-OCTOBER 1947

Customs Districts	Exports (Millions Dollars)		General Imports (Millions Dollars)	
	1946	1947	1946	1947
San Diego	3.3	2.6	.6	1.2
Los Angeles	17.8	3.4	8.7	5.1
San Francisco	32.9	3.6	18.8	3.5
Oregon	9.2	.6	2.3	.7
Washington	20.6	9.5	9.1	7.3
Total Pacific Coast	83.8	19.7	39.3	17.8

S. F. JUNIOR WORLD TRADE ASSN

Left to right: Bob Hudson, Pacific Transport Lines; Joe Del Valle, Del Valle-Kahman Co.; Howard Tobin, Pacific Far East Line; John J. Mulvehill, Jr., APL; Frank Novitzky, APL.

Left to right: Norman Mundy, Connell Bros.; Nick Andrews, APL; Jack Weese, Blue Funnel Line; Archer Mazer, APL, at recent Jr. World Wide Trade meeting.

Admiralty Decisions

By HAROLD S. DOBBS *of San Francisco Bar*

The Longshoremen's and Harbor Worker's Act

CONGRESS SAW FIT TO ENACT a compensation statute for the benefit of employees engaged in and around maritime endeavors, who, although concerned with such matters, were and are not within the definition of a seaman. The act is entitled "The Longshoremen's and Harbor Workers' Act." It includes the worker who goes aboard a vessel and is hurt while aboard, whether he be employed by the stevedore or a ship repair company, or any other so-called land agency.

The most important exception is that created for the seaman, who may bring suit against his employer under the Jones Act in either the state or federal courts. Of course, the seaman is required to prove negligence. However, he can recover maintenance and cure provided he has not been guilty of misconduct. The only reason that the seaman was not included within the Longshoremen's Act was because of the pressure of lobbying groups who were and are of the opinion that a seaman is better off suing for damages under the Jones Act and being given the right thereby to recover large sums in damages instead of relying upon the rights of a compensation statute, which necessarily provided a much more limited opportunity to collect damages for injuries. Under the Longshoremen's and Harbor Workers' Act, and most compensation statutes, the worker is given a right not enjoyed under the Jones Act or any other common law action for damages; namely, the right to collect compensation without being required to prove negligence on the part of the employer. If you have had any experience with proof of liability in negligence cases, you will readily appreciate the significance of the right given to workers under the Longshoremen's and Harbor Workers' Act as well as other compensation statutes. An employer is required by federal law as well as state law, to carry compensation insurance where his employees are necessarily required to subject themselves to employment hazards either aboard ship or on land. The penalties for failure to carry such insurance differ from state to state. However, in general, they permit the employee to sue the employer in the state courts for damages without limitation in amount wherein the employer is not permitted to prove contributory negligence or assumption of risk on the part of the employee.

The federal act gives almost the same rights to the employee. The point is interestingly handled in the recent case of *William Thorneal v. Cape Pond Ice Company & Another*, decided by the Supreme Judicial Court of Massachusetts, in which the plaintiff, a fisherman by trade, but not at that time so employed, was hired by the master of a fishing vessel owned by the defendant, Linquata, to "ice up" the vessel with crushed ice to be supplied by the defendant, Cape Pond Ice Company, at its wharf. On that same day, the plaintiff, while upon the vessel which was in navigable waters at the wharf, and while using an iron chute owned by the defendant, Cape Pond Ice Company, to convey the ice into the hold of the vessel, was injured, he contended, by a defect in the chute. Plaintiff obtained judgment on each of four counts. The court discussed the questions of fact at great length with reference to the manner in which the icing was handled and the condition of the chute and appurtenances. The jury were told by the plaintiff that he was a "lumper" and not a member of the crew. Apparently, the jury found that the Cape Pond Ice Company, owner of the chute, and the defendant, Linquata, knew or ought to have known of the ice condition which was apparently defective, and the plaintiff, on the other hand, knew nothing of its condition and did not receive any warning from either of the defendants. If the injury had occurred on land, under general principles of law, each defendant could have been found liable for negligently furnishing a defective appliance for plaintiff's use. However, as the court pointed out, this was a maritime case since the cause of action arose on navigable water. Therefore, the plaintiff's rights are governed by the applicable maritime law and not by state law. Where the maritime law, however, has failed to develop peculiar rules of its own for the definition of the defendant's duty or the determination of its character, as was the case here, the maritime law has been accustomed to look to the common law, actually if not expressly, for analogies. Under the first count, there is jurisdiction to entertain the action in the state court because the remedy sought is merely the recovery of damages and the ordinary civil procedure in the state courts is competent to give that remedy. Cape Pond Ice Company's motion for directed verdict under count No. 1 was denied.

Linquata argued that a verdict should be directed in his favor under count No. 2 because plaintiff's rights were now superseded by the provisions of the Longshoremen's and Harbor Workers' Compensation Act. The court agreed that the plaintiff, although for some purposes considered to be a seaman, was not actually a member of the crew of the vessel and therefore came within the benefits of the aforementioned act. But, as explained previously, the Longshoremen's and Harbor Workers' Act provides, under Section 905 that the exclusive character of the remedy by compensation under the Act, is subject to the exception "that if an employer fails to secure payment of compensation as required by this chapter, an injured employee . . . may elect to claim compensation under this chapter, or to maintain an action at law or in admiralty for damages". . . . In such actions, the defendant may not plead as a matter of de-

(Please turn to page 128)

Marine Insurance

The London Letter

By Our United Kingdom Correspondent

The Priam Case

The long chain of marine or war loss litigation has been added to—and greatly complicated—by the House of Lords judgment in the *Priam* case. This vessel sailed from Liverpool for Alexandria in December, 1942. Because the Mediterranean was virtually closed to us at that time, she took the Cape route. She was admittedly on a warlike adventure, and carried, among other cargo, a heavy bridge-layer tank weighing 21 tons, and two crates of aeroplanes, the tank, at any rate, being stowed on the forecastle head.

She encountered exceptionally heavy weather, in which her forward deck cargo broke adrift, damaging the hatch of No. 2 hold which was flooded and the cargo in it damaged. The vessel was insured against war risks, and the owners, the Ocean Steamship Co., Ltd., claimed on the Liverpool and London War Risks Insurance Association, Ltd., on the grounds that the stowage of the deck and other cargo, and all the vessel's manoeuvres throughout the voyage were warlike operations, and that the damage to the vessel was a consequence of warlike operations.

In the court of first instance the damage was held to attach to the war risk insurance policy, with the exception of some damage to a gun mounting. In the Court of Appeal this judgment was confirmed, although in that court the gun mounting seems to have disappeared from the picture.

Now, in the House of Lords, judgment has been given, the effect of which is that the decision of the Court of Appeal has been varied by holding the shipowners liable in respect of all the ship damage other than that of No. 2 hatch and hold.

London Insurance Market Adequate For Postwar

Addressing the Insurance Institute of London on the subject of "Looking Around the Marine Market", Mr. R. J. M. Merrett, an underwriting member of Lloyd's, said that the marine market must never be complacent, but there were some reasons for satisfaction. "Our capacity for absorbing huge values is greater today than ever," he said, "and is much larger than before 1939. Despite every difficulty we satisfied our international customers during the war, and today they turn to us for those things which they rightly expect—complete integrity and fair and impartial dealing, resourcefulness to deal with new propositions, and a bias towards generosity when the Claims Department takes over." The marine market, Mr. Merrett said, which included both Lloyd's and the Companies, was an international market offering its experience to the whole world. It must be as free as possible for many reasons, and in this changing world it must adjust itself to such new conditions as obtained in the new order which was emerging. Though there were admitted differences in organization between Lloyd's and the Companies, it should be recognized that there was room for both and sufficient for all. He advocated a continuance of the greatest degree of cooperation possible on the underwriting level for the common good while admitting those differences.

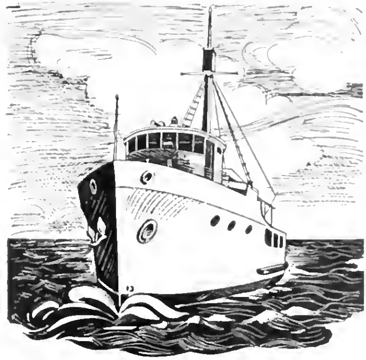
One fundamental requisite, which the present time seemed to demand especially, was as great stability in the matter of rating as possible. Unjustifiable reductions in premiums; heavy and unwarranted reductions because the market was weak, did no good in the end, for the day of reckoning came when the pendulum swung violently the other way, and increases had to be asked for as the underwriting community sought recompense for its losses. In some quarters it was regarded as an axiom that profitable years must be followed by years of depression and loss, but he challenged that view. Certainly, the widespread interests of the market ensured that almost any disaster anywhere in the world would find its repercussions in the London marine market, but, in his view, nature should be allowed to take its course without active assistance.

Two important instruments making for market stability, Mr. Merrett continued, were the Joint Hull Understanding and the Combined Marine Surcharge Agreement. The machinery of the Understanding ran, on the whole, very smoothly and fairly, and the case for it was unanswerable. Without it, the market would lose money; with it, such a thing was much less likely to happen. On the other hand, it would be quite unethical if the British shipowner were to remain subject to it while foreign shipowners were given an advantage of better conditions.

There had been suggestions for a complete abolition of the additional premiums represented in the C.M.S. scale and that complete freedom in cargo rating should take its place. Therein, Mr. Merrett said, would lie heavy losses for the market in the national and international field if that advice was followed. Were it possible for the present basic rates, many of which had been steadily reduced during the last few years, to be amalgamated with the current C.M.S. ratings, a reasonable way out could be found.

Mr. Merrett concluded as follows: "The figure of £20,000,000 a year is generally taken as the average net

(Please turn to page 131)



TUNA CLIPPER SAFETY REQUIREMENTS

By DAVID W. DICKIE

AFTER EACH DISASTER TO TUNA VESSELS, a rule was made to circumvent such a happening in the future. Some of the rules had to be changed several times but in the main the original set of rules promulgated by G. Bruce Newby, William Lambie and the writer held up remarkably well. On occasion a delegation of brokers and owners have importuned the underwriters to relax one or the other of the rules to countenance carelessness on the part of the fishermen but sooner or later the same disaster happened again and as one fishermen expressed it—the whole industry has to be penalized for the negligence of one fisherman. Bear in mind that in the case of the tuna vessels the insurance covers not only the fortuitous perils of the sea but inexperience and lack of knowledge upon the part of the fishermen of the salient facts pertaining to the fishing industry.

In the following discussion of rules, the numbers refer to the latest arrangement of the Safety Requirement Rules.

No. 1 Hatches

> Hatches on the bait wells to have a permanent coaming at least 18″ above the deck or higher, if the surveyor considers it necessary, and fitted with covers. (Covers may be insulated is desired.)

Originally the hatches were raised to 24″ as required by the American Bureau of Shipping and in some cases to 32″. The fishermen complained that the high coamings caused additional work for a group of men already exhausted from the effort of hoisting all the fish obtainable from a school of fish before it left for parts unknown.

As stability was the governing factor and the pocketing of air in the bait wells was causing concern, an effort was made to circumvent the trouble by raising the height of the hatches to reduce the free surface area when a bubble of air released itself from the well and lowered the height of the water in the well to the point where it ran out of the hatch.

During the early period of brine-well fishing the fishermen were pumping a well on one side of the vessel to clean it. This caused an excessive list and if the hatch was too low the air in the upper corner of the well released itself and added an additional moment, tending to overturn the vessel. The remedy was to issue an Instruction to the Master not to empty a well on one side without emptying a well on the other side and as long as the fishermen observed the Instruction it was not necessary to have the hatch coaming on the bait well higher than 18″.

No. 2 Hatches

> Hatches on the brine wells where flush to have metal covers. (May be insulated if desired by the owner.)

These wells are filled and the water is kept circulating to cool the fish. Once the fish are cooled down to 34 degrees the water is pumped overboard or into another well and the fish are cooled dry down to zero. The fish are dropped into the water in the well as they are caught and the excess water spills overboard as the fish displace the water, thereby eliminating free surface. The trouble here was that it was necessary to carry fuel in some of these wells for the voyage outbound and the fishermen were not careful to empty a well on the other

side when a well on one side was emptied for cleaning.

No. 3 Hatches

Alleyway hatches to have a coaming at least 24" above the deck and fitted with a watertight cover.

There is considerable coming and going through this hatch and if the water gets below, it floods the alleyway, and as the door to the engine room is usually open the engine room will be flooded too. The only remedy to avoid flooding is to raise the height of the hatch coaming.

No. 4 Hatches

All other openings in the deck to be fitted with watertight metal covers.

In some cases, to save expense, some of the boats were fitted with a 2" coaming and a wood cover dropped in with the inevitable result that water went below into spaces needed for flotation.

No. 5 Scuppers

Scuppers to be cut through the bulwark between every frame where possible, from a point forward of the galley to a point not less than 14 feet from the stern. Length of scuppers to be 75% of the distance between frames and of the following heights.

Boats 65 feet long over all ...	2" high
Boats 65 to 100 feet long over all..	2½" high
Boats 100 to 125 feet long over all. ...	3" high
Boats over 125 feet long over all.. ...	3½" high

Conflicting stories about the fishing were received from the fishermen. The technical men wanted the boats fitted with freeing ports having openings 12"x12" that would open and close easily. The fishermen objected and as a lesser of two evils accepted the scuppers. The vessels fish with the deck very close to the water so the

(Please turn to page 132)

G. M. DIESELS CRACK THE CRAB FLEET

The crab boat *Six Brothers,* recently completed at the Genoa Boat Building Company, San Francisco, is 32 feet long by 9 foot beam, and draws 3' 6". This particular boat is quite typical of the San Francisco crab fleet and there are hundreds of others of about the same dimension, but this one has many new features that are not present on the older boats.

The boat has been powered with a Model 2071, 55 H. P. General Motors Series "71" Diesel, with which the propeller is driven through a 3 to 1 reduction gear. The boat is now using a 27" diameter by a 26" pitch propeller, and with this combination the engine provides more power that can be used in the boat. This permits the maximum boat speed of 8½ knots at very conservative engine loads.

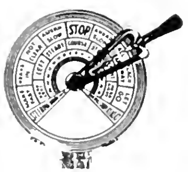
During the past year there has been a great deal of interest in this new General Motors Diesel, as the fishermen are discovering that they can replace their old heavy-duty gas engine with a modern high-speed diesel. In making this change, they not only save weight and space but they also improve their boat speed materially. In the same sense, the new engine is much cleaner and has far less vibration than experienced with the old engines.

It is thought that a trend toward General Motors Diesels has been started in the San Francisco Crab Fleet, and that many more installations will follow these initial key installations.

General Motors Powered Crab Boat "Six Brothers"

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

THE EARTH'S MAGNETISM AND ITS EFFECT ON THE SHIP AND COMPASS

IN A PREVIOUS ARTICLE, the parts and construction of the compass and binnacle were discussed. Let us, in this issue, make a study of the earth's magnetism as it affects our ship and compass, thus preparing for our discussion of practical compensation in a future article.

We will first review a few of the terms used in this article, so that we all will interpret these terms to mean the same thing.

1. *A magnet* is a body or substance having the property of attraction and repulsion of other magnetic materials and polarity.
2. *Magnetic Lines of Force* are imaginary lines passing from one pole of a magnet to the other.
3. *Magnetic Field* is the area through which magnetic lines of force are assumed to pass.
4. *Line of Demarcation* is an imaginary plane, perpendicular to the lines of force, midway between the poles.
5. *The Poles* of a magnet are points which have the greatest attracting or repelling power. (For convenience we may assume that all magnetic lines of force enter and leave these points.)
6. *The Names of the Poles.* That end of a magnet which seeks North is said to be the North or Red end. The South or Blue end is the end which seeks South.

In this, navigators can easily get an argument from physicists or electricians. They contend that the North Magnetic Pole is in the southern hemisphere. Why argue? Neither can win. So let us, as navigators, consider the poles named by colors and refer to the north-seeking end of a magnet as the Red end.

The Basic Laws of Magnetism

(1) Every magnet will have at least two poles of opposite polarity.

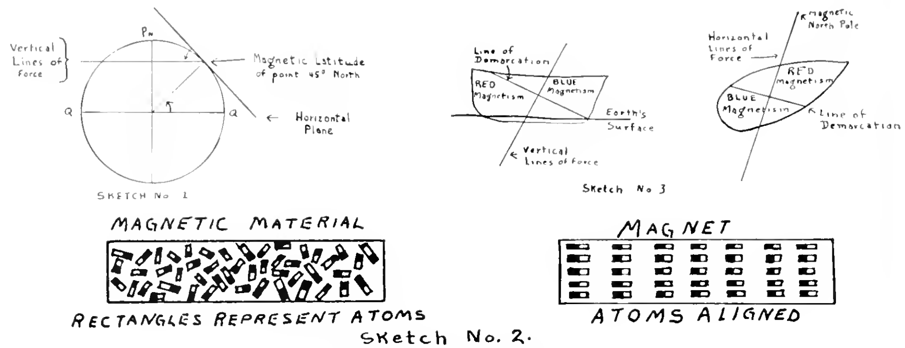
(2) Like poles repel one another and unlike poles attract one another.

(3) The magnetic force exerted between two poles varies inversely as the square of the distance.

The Magnetism of the Earth

Too much is not known about the earth's magnetism; however, we do know that it has the characteristics of any other magnet. The *Magnetic Poles* of the earth are located in latitude 71° north and longitude 96° west (approximately) in the northern hemisphere, and latitude 73° south and longitude 156° east in the southern hemisphere. The polarity of these poles (keeping in mind the basic law of magnetism that likes repel and unlikes attract, and that the north-seeking end of a magnet is said to be the red end) is blue in the northern hemisphere and red in the southern.

The earth's total magnetic force has two components, namely: (1) *Horizontal Lines of Force* which flow in a horizontal plane over the earth's surface from the red to the blue pole. These are the lines of force which give the magnetic compass its directive determining power. Though these lines are not straight, they do not cross one another and are considered as magnetic meridians. The angle at which these horizontal lines of force intersect the true meridians of the earth's surface is known as *Variation,* or *Magnetic Declination.* The intensity of



Sketches 1 to 3, illustrating points covered in the text.

these lines of force is greatest at the magnetic equator and zero at the poles. Realizing this fact, we can easily see how, when at the magnetic equator, our compass has a greater tendency to align its north-south axis with the magnetic meridians, and thus is affected to a lesser extent by the subpermanent magnetism of the vessel itself.

(2) *Vertical Lines of Force* flow at an angle to a horizontal plane at any point which is equal to the angle subtended at the center of the earth between the magnetic equator and that point. This angle is referred to as *Dip* or *Magnetic Inclination*. The intensity of these lines of force is greatest at the poles and zero at the equator.

For convenience and to picture more easily in our mind their effects on the vessel, we will study these two components as if they were distinct separate lines of force or powers, which is not, in reality, the truth. They are both a part of the same magnetic lines of force which affect materials in different ways. In our study, let us keep in mind the fact that lines of force travel in parallel lines and that each piece or mass of magnetic material is a potential magnet. All that is required in order to convert a mass of magnetic material into a magnet is to subject the mass to some sort of violence while it lies in a magnetic field, thus causing the millions of minute atoms or molecules which have both Red and Blue ends to align themselves in one direction, as indicated in Figure 2.

This violence allows the atoms to change their direction and the blue magnetism of the magnetic field attracts the red ends of the atoms so that they all align themselves within the metal. This is what occurs to the steel of our ship while being built, thus causing the entire ship to become a magnet.

Magnetism in the Vessel

We have two types of magnetism in the vessel, subpermanent and transient. These names are not necessarily given because of peculiar characteristics of the magnetism, but rather of the metal. *Sub-permanent magnetism* is magnetism which is found present in hard iron—hard iron being a term which is applied to iron or steel having the ability to retain magnetism. *Transient magnetism* is magnetism which is found present in soft iron—soft iron being a term which is applied to iron which has the ability to become instantly magnetized when placed in a magnetic field, and to lose this magnetism when removed from the magnetic field. In soft iron, the atoms have the ability to change their direction instantly as the direction of the iron is changed in relation to the magnetic lines of force. We shall deal with these two types separately as they affect the vessel.

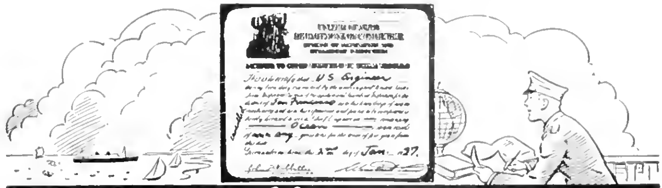
Sub-permanent Magnetism of the Vessel is that magnetism which is built into the vessel and remains with it through the life of the vessel. It is found only in hard iron. Each plate, angle, beam, stanchion, etc., is either a potential magnet or a magnet before it is assembled; then as the vessel is assembled these parts become a part of a single magnet, just as, when we take two small magnets and place them together, they become one magnet. When the vessel is completed, it becomes on huge magnet. The permanency of this magnetism is dependent on the amount of violence to which the materials were subjected while the vessel was being constructed. The greater the violence, the more permanent the magnetism. Subpermanent magnetism will be present in both horizontal and vertical hard iron.

Horizontal Hard Iron is affected only by the horizontal component of the earth's total force. The intensity of the magnetism in the horizontal hard iron of the vessel is dependent on the magnetic latitude of the place of building of the vessel and the amount of violence suffered by the material in construction.

The *Polarity, Line of Demarcation* and *Distribution* of the red and blue magnetism in the horizontal hard iron are dependent on the angle the vessel's keel made with the magnetic meridians while being built.

Vertical Hard Iron is affected only by the vertical component of the earth's total force. The intensity of the magnetism in vertical hard iron, as in horizontal hard iron, is dependent on the magnetic latitude of the place of building and the amount of violence suffered by the materials in the construction of the vessel. However, it differs in this respect. The intensity of the magnetism in horizontal hard iron is greater if the vessel is built near

(Please turn to page 130)

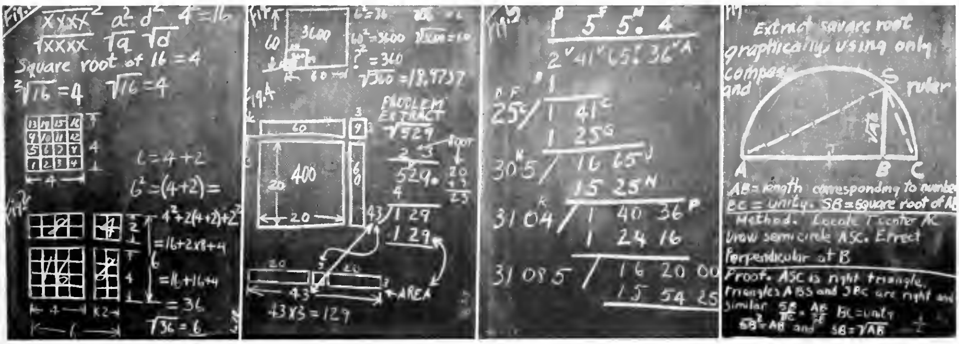


Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

"CHALK TALKS" ON APPLIED MATHEMATICS



Blackboard figures 1 to 6 mentioned in the text.

DEVELOPMENT OF SQUARE ROOT

IT MAY SEEM A LITTLE too much like a high school mathematics class to discuss the procedure for extracting the square root for marine engineers, but much experience has shown that the process is not used very much in the everyday duties of standing a watch or taking the daily fuel tank soundings, and is difficult to remember. But there comes a day for every one of us when we wish we could do it. Incidentally, we can estimate it pretty closely for the first two or three figures by guessing the square root and then multiplying the guessed root by itself to see how close to the number we come. If too high, lower the guess a little and multiply again. If too low, raise it and multiply. But *do not try this in the examinations,* as the inspectors want to see that you know the correct procedure, must see the work, and will not accept guesses. As a matter of fact, long division and extracting square root are really systems of educated guessing and somewhat alike. The systems permit us to guess only a little at a time and prove the correctness of the guess before we proceed any further. Notice that the steps are a guess as to a divisor and a multiplication to see if it is enough or too much.

First, a few general statements about squares and roots. See Fig. 1. Note that we can indicate the square of a number by drawing a line over it and adding a figure 2 at the end of the line. A 3 shows a cube and any number shows a POWER to which the base number is to be raised or multiplied by itself. If letters are used, as in al-

gebra, the line may be used or omitted. The number denoting the power is written a size smaller and at the upper right hand corner on the base number or letter.

Fig. 1 also shows the geometry of the square indicating whence the process got its name. If the number represents a linear dimension or measurement then the square of the number is necessarily an area. Conversely, the square root of an area is the dimension of a side of a square of the same area. But the square root of a number which has no meaning as an area has no meaning either, and is just a number—nothing more.

Fig. 2 of the Blackboard Sketches is shown to indicate the geometry of the square of the sum of two numbers such as 4 or 2 or a total of 6. Note that the square of the sum is the square of the first plus twice the product of the first by the second plus the square of the second.

Fig. 3 shows that while the square root of 36 is 6, the square root of 360 is not 60, but 18.9737 . . . and we must go to 3600 before the square root is 60. The rule, then, is that to move the decimal point one place in a number moves it two places in the square and in the same direction. This explains why we handle the number, whose square root we want, in sections of two places in each direction from the decimal point.

Fig. 4 is an attempt to show geometrically the several steps in the step-by-step guessing process of extracting the square root. Using the simple number 529, we sectionalize it to 5′ 29! We handle the 5 first, which really is 500. (Note that any number is really a sum; for instance, 7845 is actually 7000, plus 800, plus 40, plus 5.) We guess at the largest root it contains, 3 squared is too much; 2 squared is about right—a little small, but the largest root we can use. This 2, then, is 20 because 20 squared is 400. It is represented by the large area in the figure.

There remains 529 minus 400, or 129 which must still be factored. This 129 represents the area of the two rectangles and the area of the small square. Of these three areas, we know only the one dimension—that of the long side of the rectangle, or 20 in this case. We can guess at the other dimension by taking half of the 129 and dividing it by 20—but this is the same as dividing the whole 129 by 2 times 20 or 40. This accounts for the rule of doubling the root so far obtained before dividing. So we divide the 40 into the 129 and, of course, get 3. Note also in the figure that these three areas if laid end to end would make one long rectangle whose long side is 43, and whose short side is 3. We know that the total area of the group is 129, so we add the 3 in the root to the 40 to give 43 as a divisor. It goes evenly with no remainder, and the original number was a perfect square. This we prove by multiplying the 3 times the 43 to give us the 129. There is a more nearly perfect proof of this process but it involves more than we need to take up here.

Fig. 5 is a demonstration of the process with a larger number which is not a perfect square and also has a decimal. The letters located at the several places refer to the following paragraphs, step by step.

A—Write the number, plenty of space below, large decimal point, check mark over the decimal, check mark over every other space from the decimal and draw a line over the entire number.

B.—Write the square root of the left hand pair or single as the case may be. This must be guessed. Write the square of this guess below also at B. Draw a line and subtract, giving us in this case, 1.

C.—Draw a slanting line here and bring down the next pair of numbers, 41 here.

D.—Multiply the answer or root above the line, whatever it may be, by 2 and write it here.

E.—Cover the last figure here with the finger, leaving, in this case, only the numbers 14 visible.

F.—Divide the figure 2 at D into this 14 and write the answer above the next pair as at F in the answer, and write it beside the 2 also at F. This is only a trial or guess and in this case the figure 7 was too much, so also is 6, and we fall back to 5, proving by multiplication, the 5 by the 25.

G—Here the proof is multiplied out and the subtraction shows 16 remainder.

H.—Draw the line again.

J.—Bring down the next pair, 65 in this case.

K.—Again double the answer—in this case the numbers at B and F, or 15, giving 30.

M.—Cover the 5 in the 1665 and divide the 30 into the 166 now visible. Write up the answer 5 as shown. Also write the 5 at K. Multiply the 5 at M by the 305 at K, writing the answer at N.

N.—Subtract, getting 140 remainder.

P.—Bring down the next pair, also draw the slanting line.

Continue through as before with the numbers getting larger with each step. There is still a remainder and we might continue on indefinitely, always getting a remainder, but our answer becoming more and more accurate. Having as many numbers at the right of the decimal as was in the original number should be accurate enough. The student should go over this many times with other numbers proving the correctness of the root by squaring it. The root given in Fig. 5 is 155.45, and squaring this we have a number 24164.7025. This is less than the square we started with, and subtracting we find a difference of .6575. This is the error in our calculations.

In the final analysis there is a graphical solution for every mathematical problem. By this is meant that without recourse to figures, multiplication and division, it is possible to get an answer by drawing the problem out on a board or otherwise constructing it. For example, by trigonometry we know that the diagonal of a square is 1.41 times a side. But we could have found this out by constructing a square and measuring the side and diagonal. We could avoid division by drawing the side one unit of length long and then measuring the diagonal as 1.41 units. Of course, to find the number of feet of lumber in a house we may have to build it and then measure the lumber. But we would have avoided mathematics. So mathematics can be as much help to us as we will make use of it.

An interesting illustration of the construction solution is to find the square root of a number by using a straight edge and compass only. Fig. 6 shows this and gives a rough proof. The length of the line BS is the square root of the length of the line AB. Draw AB of a length to be a measure of the number whose root is wanted. Extend the

(Please turn to page 130)

Running Lights

HARVARD
PAUL
STEWART,

Manager of
Marine Sales
for
Bethlehem Steel
Company's
Bay Area Yards

(See Page 110)

Harvard P. Stewart Appointed by Bethlehem

Announcement has just been made of the appointment of Harvard Paul Stewart as Manager of Marine Sales for Bethlehem's Bay Area Yards. Stewart succeeds John T. Greany who died recently following a short illness. The announcement was made by W. M. Laughton, District General Manager of Bethlehem's Shipbuilding Division, West Coast Yards.

Stewart is a native of Alameda and a graduate of the University of California, Class of 1934, where he received a BS Degree with honors in engineering. He took post-graduate work in ship model testing at the same university and assisted in the establishment of U. C.'s first ship model test basin. In 1934 he started work at Bethlehem's San Francisco Yard as mold loftsman. In 1935 he was transferred to the Estimating Department, and a year later to the Sales Department.

He is a member of the Society of Naval Architects and Marine Engineers and a member of the Executive Committee of the Northern California section of the Society, of which he is also a former secretary-treasurer. He is a member of the National Engineering Honor Society, Tau Beti Pi and an associate member of the National Physical Honor Society, Sigma Zi.

Currently, Stewart is House Committee Chairman of the San Francisco Propeller Club. He is a member of the San Francisco Junior Chamber of Commerce and is representative of the Junior Chamber on the Bay Area Maritime Committee. His hobbies include skiing, mountaineering and photography.

King's Point Alumni

All graduates of the U. S. Merchant Marine Academy at King's Point, N. Y., now living in the San Francisco Bay Area are requested to register at the newly opened offices of the Academy's Alumni association. The Bay Area chapter now maintains offices at room 1101, De Young Bldg., 690 Market St., San Francisco. Warren Boone is president of the group.

Over 300 graduates of the Academy are now members of the local chapter, although three times that number are believed to be living in the bay region. California is second only to New York in the number of graduates from the national Merchant Marine Academy.

W. A. Harrington

W. A. Harrington Heads San Pedro Yard

W. A. Harrington has been named Manager of the San Pedro, California, yard of Bethlehem Steel Company, as announced by W. M. Laughton, General Manager of Bethlehem's West Coast Yards. San Pedro Yard is on Terminal Island in Los Angeles. Harrington succeeds E. C. Rechtin who has been transferred to an executive position with the company in the East.

Harrington is well known in shipbuilding and ship repair circles on the West Coast, where he has lived since 1916. On moving to the West Coast, he became a loftsman and an Inspector of ships for the U. S. Shipping Board. He came to the San Pedro Yard in 1923 as chief estimator, was later made general yard foreman and sales manager, becoming assistant manager in 1944.

Ray Perin

Russell R. Sweeny Becomes Manager of Bethlehem-Alameda Repair Yard

Russell R. Sweeny, Manager of Bethlehem Steel's Alameda Repair Yard

Russell R. Sweeny, formerly assistant to the general superintendent at Bethlehem's San Francisco Yard, has been appointed manager of the company's Alameda Repair Yard, according to a recent announcement by W. M. Laughton.

Sweeny is a native of Antioch, California, and came to work for Bethlehem in 1916 as a shipfitter apprentice at what was then the Union Iron Works. In 1931 he became Hull Department Foreman at the Alameda Repair Yard, and in 1939 was appointed assistant to the general superintendent at that yard. He returned to the San Francisco Yard in 1940 where he was placed in charge of conversion work on the *President Lincoln*. He was made assistant to the general superintendent in 1942.

Scintilla Magneto Division Appoints George M. Anger

Announcement has just been made of the appointment of George M. Anger as Western States Representative for Scintilla Magneto Division of Bendix Aviation Corporation, Sidney, New York. The company is planning to establish an office in San Francisco, where Anger will maintain his headquarters.

George M. Anger

Ray Perin Heads Materials Handling Association

Ray Perin, of the Ira G. Perin Co., west coast representative for Elwell-Parker Trucks for 35 years, has been elected president of the 14-year old Materials Handling Association of Northern California.

Perin is a graduate of Stanford University, class of 1930. He served with the Goodyear Rubber Company at the British plant during the war, and upon his return joined the Ira Perin Company. He is a member of the American Society of Mechanical Engineers.

H. M. Cahill Appointed

According to a recent announcement by R. W. Bayerlein, Vice president of the Heavy Machinery Division, Nordberg Manufacturing Co., H. M. Cahill has been appointed as Sales Manager, Small Engine Department.

Cahill has had extensive sales engineering experience in the smaller four-cycle Diesel engine field. Before coming to Nordberg, he was Assistant to the Sales Manager of National Supply Co., of Springfield, Ohio. He has also been associated with the Buda Company, Harvey, Illinois.

Cahill will have charge of sales of Nordberg four-cycle 4½", 9" and 13" bore Diesel engines. L. L. Peterson, Sales Manager, Large Engine Dept., is responsible for sales of the 16" bore size four-cycle engine and the larger Nordberg 2-cycle Diesel engines. Foreign sales of all Nordberg products is directed by B. T. Eagerton, Export Sales Manager.

H. M. Cahill

At The KINGS POINT MERCHANT MARINE ACADEMY

◄

Vice Admiral William W. Smith, USN (Ret.), Chairman, Maritime Commission, accepting bronze plaque presented to the Merchant Marine Academy by the Society of Naval Architects and Marine Engineers honoring the distinguished wartime achievements of the late Vice Admiral Howard L. Vickery. Left to right: Vice Admiral Edward L. Cochrane, USN (Ret.), president, Society of Naval Architects and Marine Engineers; Admiral Smith; Lt. Comdr. Hugh B. Vickery, USN, son of Admiral Vickery, Rear Admiral Telfair Knight, Chief of Training Division, Maritime Commisson.

►

Vice Admiral Edward L. Cochrane, USN (Ret.), President, Society of Naval Architects and Marine Engineers, making introductory address during ceremonies attending presentation of bronze plaque honoring the distinguished wartime achievements of the late Vice Admiral Howard L. Vickery, USN (Ret.), creator of the famous "Bridge of Merchant Ships" which assured victory in the recent world conflict. Left to right in the above picture are: Vice Admiral William W. Smith, USN (Ret.), Chairman, Maritime Commission, Mrs. Howard L. Vickery, Mrs. Barbara Vickery Bowie, Admiral Cochrane, Mrs. Edward L. Cochrane, Rear Admiral Telfair Knight, USMS, Chief, Training Division, Maritime Commission, Lt. Comdr. R. E. Salman and members of the Society of Naval Architects and Marine Engineers.

◄

Grounds and buildings of the U. S. Merchant Marine Academy on the shore of Long Island Sound at Kings Point, N. Y. View looks east. Hague Basin and Mallory Pier in foreground. Academic Buildings left side of campus (progressively from west to east). Department of Nautical Science, Dept. of Engineering and Department of Ship Management. Center, Wiley Hall (former Walter P. Chrysler residence); Regimental Barracks (right of Wiley Hall, reading counter-clockwise), Palmer, Murphy, Delano, Cleveland, Rogers, Jones and Barry Halls. Center background, O'Hara Hall and Furuseth Barracks. Left center background, Tomb Memorial Drill Field and Roosevelt Athletic Field.

Additional photo on page 118.

BETHLEHEM-BUILT

S. S. YAQUE, first of nine sister-ships being built at Bethlehem-Sparrows Point Shipyard.

Custom-Built FOR THE JOB

Main Particulars of the Reefer S. S. Yaque

ength, between perpendiculars	365 *ft*
eam, molded	56 *ft*
epth, molded	36 *ft*
raft, loaded	26 *ft*
eadweight	5,000 *tons*
argo capacity	195,000 *cu ft*
assenger capacity	12
ea speed	16 *knots*
achinery	*geared turbine*

ncorporating advanced design features resulting from Bethlehem's long xperience as a builder of ships of all ypes, the *S.S. Yaque* is the first of a fleet of nine combination cargo-passenger, fully-refrigerated sister ships which the Bethlehem-Sparrows Point Shipyard will deliver to the United Fruit Company during 1947.

A model of postwar shipbuilding craftsmanship, this trim vessel has been designed and constructed to meet the special requirements of the operator's trade.

It is an example of the excellent results obtainable through close collaboration between the owner and the builder. In all details, it's Bethlehem-Built for the job.

SHIPBUILDING YARDS

QUINCY YARD
Quincy, Mass.
STATEN ISLAND YARD
Staten Island, N. Y.
BETHLEHEM-SPARROWS POINT SHIPYARD, INC.
Sparrows Point, Md.
SAN FRANCISCO YARD
San Francisco, Calif.
BETHLEHEM-ALAMEDA SHIPYARD, INC.
Alameda, Calif.
SAN PEDRO YARD
Terminal Island, San Pedro, Calif.

SHIP REPAIR YARDS

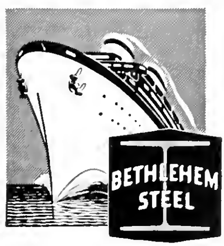
BOSTON HARBOR
Atlantic Yard
Simpson Yard
NEW YORK HARBOR
Brooklyn 27th Street Yard
Brooklyn 56th Street Yard
Hoboken Yard
Staten Island Yard
BALTIMORE HARBOR
Baltimore Yard
SAN FRANCISCO HARBOR
San Francisco Yard
Alameda Yard
SAN PEDRO HARBOR (Port of Los Angeles)
San Pedro Yard

HIPBUILDING . . . SHIP CONVERSIONS . . . SHIP REPAIRS
NAVAL ARCHITECTS and MARINE ENGINEERS

BETHLEHEM STEEL COMPANY

Shipbuilding Division

GENERAL OFFICES: 25 BROADWAY, NEW YORK CITY



NEWS FLASHES

APL PLANS MORE LUXURY SHIPS

American President Lines' president, George Killion, announces plans under consideration for converting the P-2 type liners General W. H. Gordon and General M. C. Meigs to the luxury status of the President Cleveland and President Wilson. The latter, sister ship of the Cleveland, will be completed during the spring.

* * * * *

THE V-2000

Bids on the proposed five V-2000's for American President Lines are still under consideration by both APL and Maritime Commission. These are to be cargo-passenger vessels and are somewhat between the C-3 and P-2. Indications are that they will cost in the neighborhood of $50,000,000. Newport News was low bidder.

* * * * *

NEW COAST TANKER COMPANY

Organization of Coastwise Bulk Carriers, Inc., to operate tankers in the domestic trades was announced December 23 by William T. Sexton, Sr., president. A contract for operation of the tankers will be negotiated with Coastwise Line, he said.

Coastwise Line currently maintains a Pacific coastwise service as well as a world-wide tramping operation. In addition, it does extensive general agency work. Tankers acquired by Coastwise Bulk Carriers, Inc., will be operated in coastwise, intercoastal and Gulf services.

* * * * *

ALASKA SS CO. AND SKINNER & EDDY IN MERGER

Merger of the Skinner & Eddy Corp. with the Alaska Steamship Company "to simplify the overall corporate structure of the Alaska Steamship Company and to broaden and further strengthen its financial position," was announced this week by G. W. Skinner, president. The corporation has owned Alaska Steamship Company since 1944. Plans include acquisition of new freight and passenger ships suitable for needs of the territory, Skinner said.

* * * * *

THREE BIG ARMY JOBS TO BETHLEHEM, SAN FRANCISCO

The San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division, has just been awarded contracts totaling approximately $7,000,000 for the modernization-conversion of two C-3 type Army troop transports, the Frederick Funston and James O'Hara, and the "safety-at-sea" conversion of the Army Hospital Ship Comfort, a C-1 type vessel.

Type of work to be preformed ón the Funston and O'Hara is very similar to that which Bethlehem's San Francisco Yard is now doing on two other Army transports, the Shanks and Ainsworth, in that they are being converted from 100% troopship to combination troop and passenger.

* * * * *

ARMY AWARDS NINE CONVERSIONS TO COAST YARDS

Brigadier General N. H. McKay, Port Commander at the San Francisco Port of Embarkation, announces that contracts have been awarded by the Chief of Transportation for conversions on nine additional passenger vessels of Trans-

portation Corps registry with home port here. They will enter the shipbuilding yards at various times before March 1 for work expected in most instances to require 90 working days.

The vessels and the yards: Hospital Ship Comfort and transports O'Hara and Funston, Bethlehem Shipbuilding Corp., San Francisco; Generals Collins and Freeman, Todd Yards, San Pedro; Generals Hodges and Hase, Todd Yards, Seattle; Kenerals Patrick and Morton, Pacific Ship Repair, San Francisco.

A third phase of the Transportation Corps ship modernization program is nearing completion. Four P-2 transports assigned to San Francisco are in the Newport News Shipbuilding Corporation yards on the Atlantic Coast being given final conversion to fit them for permanent peacetime passenger service for the Army. They are the USAT's Admirals Eberle, Hughes, Capps and Benson. First of them is expected to be completed by mid-February.

* * * * *

GREAT CAPITAL EXPENDITURES EXPECTED

Morris Sayre, president of Corn Products Refining Company of New York, will be the new president of the National Association of Manufacturers. Retiring president Bunting asserts that most conservative estimates for rehabilitation of worn out machines and inefficient factories is $6,000,000,000 a year over the next five years.

* * * * *

STANDARD OIL EXPANDS AT BAKERSFIELD

A $7,500,000 construction program to expand and modernize its Bakersfield refinery was announced today by Standard of California. New units planned in the program will include the latest in crude distillation and cracking facilities, an office building and laboratory, and modern auxiliary equipment. Capacity of the plant will be increased to a crude run of 20,000 barrels daily, practically double the present capacity.

* * * * *

INDUSTRIAL DEVELOPMENT AT LOS ANGELES

During the month of November, 15 new factories were established in Los Angeles county with a total investment of $593,000, and creating 257 new jobs for factory workers. Thirty-eight existing plants were expanded, calling for an additional investment of $6,411,000, and creating 694 new industrial jobs.

Total investment in the 53 new and expanded units was $7,004,000, creating a total of 951 new jobs.

For the year to date, 200 new factories were established with a total investment of $68,261,000, and creating 7,321 new jobs; 382 existing plants were expanded, calling for an additional investment of $51,560,500 and creating 12,650 new industrial jobs.

* * * * *

STANDARD OIL COMPANY (NEW JERSEY) PURCHASES ELEVEN TANKERS

Purchase of 11 tankers from the Maritime Commission was confirmed in a recent announcement by Standard Oil Company (New Jersey). Assignment of the ships to the Esso fleet will be material help to the company in its efforts to meet the unprecedented demand for petroleum products.

All vessels are the Maritime Commission T2 type, with turbo-electric propulsion. Four of the ships, Esso Allentown, Esso Asheville, Esso Everett and Esso Worcester, were built at the Kaiser Shipbuilding Company's yard, Portland, Oregon, four Esso Binghamton, Esso Bridgeport, Esso Burlington and Esso Wheeling, at the Alabama Dry Dock & Shipbuilding Company's plant, Mobile, Alabama, and three, Esso Greenboro, Esso Linden and Esso Shreveport, by the Sun Shipbuilding & Dry Dock Company, Chester, Pennsylvania.

* * * * *

NEW SHEET MILL FOR COLUMBIA STEEL

J. Lester Perry, president of the Columbia Steel Company, A U. S. Steel subsidiary, confirmed a statement of War Assets Administration announcing the

proposed purchase of a surplus property located in Los Angeles, adjoining the town of Torrance.

Columbia Steel Company has offered to buy a surplus property owned by the War Assets Administration located at Los Angeles. This property, consisting of land, improvements and buildings, originally was a part of an aluminum reduction plant built during the war.

The property acquired will be utilized to house the new cold reduction sheet mill which Columbia Steel Company recently announced it would build in the Los Angeles area. The new mill will further process hot rolled steel coils produced at other existing plants into the sheet steel so greatly needed in the Western states.

* * * * *

APL BUYS VICTORIES

The Board of Directors of American President Lines has approved the purchase of four 17-knot Victory-type cargo ships from the total of 21 Victories which the Company is now chartering from the Maritime Commission. The Board's favorable action to buy the vessels indicates the Company's faith in the growth of commerce between the United States and countries in the Far East where industrial and economic development is taking place.

* * * * *

GREAT INCREASE IN SHIPPING AT LOS ANGELES-LONG BEACH HARBOR

Ships calling at Los Angeles-Long Beach Harbor averaged nearly 10 a day during 1947, a sharp increase over 1946, according to a survey by the Marine Exchange of the Los Angeles Chamber of Commerce.

The 1947 total of 3,995 vessels using the metropolitan area's harbor facilities was a 36 per cent increase over the 2,930 recorded during 1946. Total tonnage was up 38 per cent, from 10,916,093 to 15,063,983. Only Russia sent fewer ships to Los Angeles-Long Beach docks last year than in 1946, the Marine Exchange report revealed.

* * * * *

BAY AREA EXPANSIONS--1947

San Francisco-Bay Area industrial expansions during 1947 continued to hold nation-wide attention with new industries and expansions amounting to 600 projects with investments of 100 million dollars. Nearly 2,000 industrial projects have been announced for Northern California since V. J. Day with total outlays of 325 million dollars.

During the year the Ford Motor Company and the General Motors Corporation offered to purchase more than 100 million dollars worth of car parts a year from California manufacturers, and a number of plants in the Bay Area have already signed contracts. Of 200 of the largest industrial projects, 46 expected to invest 1 million dollars or more on their individual projects; whereas 34 expected to expend between 500 thousand and 1 million dollars; and 90 others planned programs ranging from 100 to 500 thousand dollars. More than one-quarter of the major projects are related to the food industry.

Plant expansions and equipment costing $70,000,000, authorized by the U. S. Steel Corporation in the Western states since the end of the war, were recently announced to supply an increased demand for steel by the widespread and diversified expansion of industries in the West. Geneva Steel Co., Utah, has a program for production of 85,000 to 95,000 tons of steel ingots per month; approximately 50,000 tons of steel plate are made from these ingots, 11,000 tons for structural shapes and 6,000 tons for steel billets monthly. There are 5,600 persons employed at the Geneva Works. Included in this giant steel program is a new $25,000,000 cold roll reduction mill at Pittsburg to make sheet steel and tin plate. About 800 men will be required to run the new mill at Pittsburg in addition to the 3,000 already employed there by Columbia Steel Co.

THE GRADUATING CLASS AT KINGS POINT

U. S. Maritime Commissioner Richard Parkhurst addressing the graduating class at the U. S. Merchant Marine Academy, Kings Point, N. Y., when 258 officers from forty states of the nation, and Alaska, Hawaii and the Canal Zone were graduated with their commissions as Ensigns in the Naval Reserve and their licenses as deck and engineering officers of the Merchant Marine. L. to r.: Capt. H. A. Andrews; Chaplain Harpole; Col. Jerome B. Crowley, Sec.-Treas. American Bureau of Shipping, Capt. H. V. Nerney, Executive Officer; Rear Admiral E. H. Smith, USCG, Commander, Third Coast Guard Dist.; Rear Admiral Telfair Knight, Chief, Training Div., U. S. Maritime Commission; Rear Admiral Richard R. McNulty, Supt. of Academy; Commissioner Parkhurst, Lt. Comdr. R. H. O'Connell; Capt. Wm. McGuire, Officer-in-Charge, Marine Inspection, Port of New York; Vice Admiral Herbert E. Leary, USN (Ret.); Capt. Andrew R. Mack, USN, Chief of Staff, Third Naval District; J. W. Baker, Pres., Board of Underwriters of New York; Henry C. Thorn, Past Pres., Board of Underwriters of New York; Capt. Leonard Frisco, USNR, Naval Reserve Officer, Third Naval District; and Oliver D. Colvin, Pres., Cargocaire En-Engineering Co.

COMMODORE IHRIG ADDRESSES PROPELLERS

The San Francisco Propeller Club was given an earnest talk on the operation of the California Maritime Academy at its November meeting, by Commodore Russell M. Ihrig, new superintendent.

Commodore Ihrig's shore duties during his 29 years of active Naval service have been almost entirely along lines which gave him special background experience for his duty as superintendent. Well known in the Bay Area, he was associate professor of Naval Science and Tactics at the University of California during 1934-36, and had charge of the R.O.T.C. unit on its two annual battleship cruises to Hawaii.

Left to right. George Swett, W. C. (Bill) Markey, and Henry Wickert, at the November Propeller Club Meeting

Bud Stewart, Captain R. C. Dwyer, Hugh Gallagher, Commodore Ihrig, Lewis Lapham, Captain Blackstone, Lloyd Fleming, Carl MacDowell. Commodore Ihrig was speaker of the day.

Ray Sanders

Ray Sanders Appointed General Manager of Pacific Chemical Company

Ray Sanders, closely identified with the industrial chemical field for the past twenty-five years, has been appointed general manager of the Pacific Chemical Company, Los Angeles, a division of the American-Marietta Company, according to a recent announcement.

The appointment of Mr. Sanders coincides with the company's announced plans to expand its activities. A pioneer in the field on the Pacific Coast, Pacific Chemical not only produces a large line of industrial chemical compounds and processes but such popular consumer brands as Hypro Bleach and Pronto Bowl and Drain Cleaner.

In addition to its main offices and two plants in Los Angeles, the Pacific Chemical Company has offices in principal West Coast cities and a third plant in Waco, Texas.

Atlas Paint Widens Distribution

Upon completing an extensive tour of the East, E. W. Whittemore, Sales Manager and General Partner of the Atlas Paint and Varnish Company of Los Angeles, announced the establishment of five new distributors for Atlas Marine Paints. Northern distribution will be handled by the Maxwelton Company of Mystic, Connecticut. Powers Outboard Motor Sales of Richmond, Virginia, will cover the Virginia and Washington, D. C., territory. Mount Pleasant Boat Building Company, Mount Pleasant, S. C., has been assigned to South Carolina. Brunswick Marine Construction Company of Brunswick, Ga., will represent Atlas in Georgia and North Florida, and the Phillips Hardware Company of Miami, Florida, will handle the line in southern Florida.

The success of Atlas Marine Paints on the Pacific Coast leads Atlas to believe that their introduction to the Eastern Seaboard may be likewise successful. One of the leaders in the Atlas Marine Line is their Gold Label Copper Compound for wooden boat bottoms.

Alfred P. Wheeler Elected President of Northern California Industrial Editors Association

Alfred P. Wheeler, Editor, "Matsonews," Matson Navigation Company, has been elected president of the Northern California Industrial Editors Association. Wheeler succeeds Norman S. Jones of the Friden Calculating Machine Company who served as president during 1947.

Others elected included Lloyd Harris Paraffine Companies, vice president; Jean Wagner, Cutter Laboratories, secretary. Martin Depper, Federal Reserve Bank and Emmett Fitzpatrick, Southern Pacific Company, were elected to the executive committee.

The organization is composed of editors of house publications of the leading industries of Northern California.

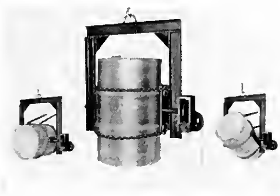
E. W. Whittemore

KEEP POSTED

New Equipment and Literature for Yard, Ship and Dock

Drum and Barrel Tilt

THE PALMER-SHILE COMPANY, 16031 Fullerton Avenue, Detroit 27, Michigan, has just announced a new drum and barrel tilt. Designed to simplify materials handling and eliminate hand dumping, this new drum and barrel tilt is a proven timesaver for any modern industrial plant. Excellent for controlled dumping of chemicals, liquids, plastics, molding powder,



scrap, glass, etc. Unit illustrated is 1000-lb. capacity for standard 55 gallon drum or barrel. Special sizes or capacities can be built to suit individual requirements. Equipped with two safety style locking devices that hold barrel securely without slippage. Barrel can be turned 360 degrees. Turning mechanism incorporates the worm drive principle and is available in hand chain models. Entire assembly is constructed of heavy structural steel, completely welded throughout. Weight is approximately 125 lbs.

New Clamp Provides Safe Easy Way to Handle Awkward-Shaped Article

MERRILL BROTHERS, of Ma peth, N. Y., are the manufacture of a new clamp, known as the Me rill-Volz Positive Grip Clam which provides a simple, rapid ar safe method of raising or lifting in place such items as large tank flanged heads, and similar articl which are usually difficult to g securely attached. The clamp w lift anything that has sufficient fl surface for its jaws to grip, and is said that once the grip is esta lished, no amount of pulling weight, even if the surface is oil or greased, will cause the jaws lose their grip. The clamp is ma in ½-ton, 1-ton, 3-ton and 6-to sizes.

New Slide-Rule Selecto Provides Fingertip Information on Inco Nickel Alloys

No more wading through a who library of metal information eve time you need a fact or two abo a particular alloy. The new "In Nickel Alloys Selector" kit can pr vide all the important facts abo any metal you are likely to be usin in a matter of seconds. The bookl in the kit, "Properties of Son Metals and Alloys," tabulates repor from twenty-two metal producers o

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

....issue. Page No..............

....

....

....

(Identify by name of manufacturer and catalog)

NAME...

BUSINESS...

ADDRESS...

the composition, mechanical properties and physical constants of 104 of their alloys.

With this Selector, you simply push the slide and turn the dial. Any fact needed on this important family of "white" metals can instantly be read at a glance. The Selector also includes a listing of available forms and an index to ASTM, Federal and Navy specifications for each alloy.

The Selector and booklet come in a handy filing case that will fit any desk file. You can obtain these by dropping a note to your nearest branch of the International Nickel Company.

Steam Jet Ejectors Catalog

C. H. WHEELER MANUFACTURING COMPANY has just issued a new catalog, No. 1462, entitled "Steam Jet Ejectors." It contains 36 pages and includes 30 sectional drawings—also flow diagrams, engineering data, installation guide, formulae, curves and tables. It covers the theory and operating characteristics of steam jet ejectors for all classes of vacuum service, including single, two, three, four and five stage types. Non-condensing and condensing types, with barometric inter- and after-condensers for vacuum requirements in chemical plants, food plants, sugar refineries, oil refineries, power plants, etc., are fully covered. The catalog also contains information regarding steam jet vacuum refrigeration for water cooling requirements of air conditioning and process applications.

Radiomarine Introduces New 30-watt Radiotelephone at Motor Boat Show

A new compact 30-watt radiotelephone, known as the ET-8037 and engineered specifically for requirements of pleasure craft and work boat owners, was viewed for the first time at the National Motor Boat Show in New York. It combines a 4-tube 30-watt transmitter, an 8-tube receiver plus a rectifier tube, a built-in loudspeaker, a push-to-talk modern handset and a compact power unit, in a cabinet 13" wide, 20" high and 14[illegible]" deep. It operates from a bo[illegible] power supply of either 12, 32, 1[illegible] volts DC or 115 volts AC and has six crystal controlled channels.

The manufacturer claims small power consumption, adequate offshore range, quick-heating miniature tubes, smaller crystals, improved noise limiter, filtered power supply, permanently pretuned circuits, antenna trimming control and integral power unit.

The ET-8037 is easy to install, operate and service. Maintenance and service are simplified by the design of the cabinet.

Radiomarine also displayed Model ET-8028-A, a 10-watt, 4-channel 2-way radiotelephone with small remote control unit, standard telephone handset and built-in loudspeaker; Model ET-8012D, 75-watt, 10-channel, for offshore duty aboard craft equipped with either 32 or 110 volt electrical systems.

The LOng RAnge Navigation instrument — Loran receiver, model LR-8801—was also exhibited. It is being used successfully on larger ocean-going pleasure craft, fishing vessels and merchant ships.

Raytheon Radar Popular

Since the end of the war, Raytheon, through its marine affiliate, Submarine Signal Co., has sold over 300 Mariners Pathfinder radar equipments. The volume amounts to more than $2\frac{3}{4}$ million dollars. Installations have been made on ocean passenger and cargo ships, oil tankers, colliers, ferries, whalers, tuna clippers, pleasure craft, ships in the Great Lakes and Inland Waterways, and vessels in such special services as geophysical survey, harbor patrol, cable laying, as well as foreign navies and maritime agencies of the world.

Swett Company will Manufacture Heater

The industrial department of George E. Swett Company, San Francisco, has entered into a million-dollar contract with Production Engineering Company of Berkeley for the manufacture of the Watrola Heat Generator. Grinnell Company will be the distributor.

This device was developed under the supervision of Jim Swett and has aroused much favorable comment from those who have seen it.

Albert R. McMullen

Albert R. McMullen

Albert R. McMullen, retired official of the Federal Shipbuilding and Dry Dock Company, died suddenly at his home in Maplewood, New Jersey, on November 24.

Mr. McMullen was born in Canada, and began his career as an apprentice in a small machine shop in Nova Scotia. When he came to this country, he was employed by the Worthington Pump & Machinery Corp. and the Terry Steam Turbine Co. for short periods and came to Federal Shipbuliding at Kearny, New Jersey, in 1919.

At Kearny, Mr. McMullen had charge of construction and installation of many new types of marine propulsion. Under his direction hundreds of exacting tests were made on a great variety of propelling plants and associated ship machinery. He gained recognition from outstanding ship designers for his work.

He was a member of the Society of Naval Architects and Marine Engineers, and the Marine Square Club of New York City.

John T. Greany

John T. Greany, 59, Manager of Marine Sales at Bethlehem Steel Company, Shipbuilding Division, San Francisco Yard, passed away December 11, following a short illness. Mr. Greany had been with the company for more than 40 years, and was a well-known figure in Bay Area marine affairs. Before coming to Bethlehem Steel, he was associated with the original Cramp Shipyard in Philadelphia, of which city he was a native. He was a resident of Ross, Marin County.

Mr. Greany is survived by his widow, Mrs. Marie Greany; a son, John T. Greany, Jr.; a daughter, Mrs. Elliott Bordfeld; a brother, William Greany of Detroit; and two sisters, Mrs. Elizabeth Larkin and Mrs. Nellie Roney, both of Philadelphia.

At the time of his death, he was a member of the following clubs: The Olympic Club, Propeller Club, Commercial Club, Mariners Club, and the Meadow Club in Marin County. He was also Treasurer of the San Francisco Marine Exchange.

John T. Greany

Ralph V. Scott

Joe Costello

William Rudy

John Cordes

Robert G. Allen Announces Expansion to the West Coast

Announcement has just been made by Robert G. Allen, President of the Robert G. Allen Co., 502 Third Avenue, Brooklyn, N. Y., marine and industrial chemical manufacturer, of the expansion of his company and production of his products on the West Coast under the name of the Robert G. Allen Pacific Co., Inc., located at 8460 So. San Pedro Ave., Los Angeles.

The officers of the newly-formed company include men who are well-known to the industry as chemical consultants with engineering backgrounds.

Ralph V. Scott is president; William Rudy, 1st vice president; John Cordes, 2nd vice president; Joe Costello, director and Joe Bachand, secretary and treasurer.

Scott will be in charge of sales and advertising, and will assist his distributors in each port on the Pacific Coast. The J. M. Costello Supply Company, Wilmington, California; Cordes Bros., San Francisco; and the John H. Marvin Company in Portland and Seattle will augment their sales and service facilities. William Rudy is in charge of the industrial chemical department, and Joe Bachand is the head chemist.

While Allenite and Allencote continue to be shipped from the Robert G. Allen plant in Brooklyn, all other products of the firm, including Scaletex, Mulsivex, Dualene, and Vaptex are being produced at the newly-constructed plant in southern California. This firm holds the exclusive sales and export rights for the eleven Western States, western Canada, Alaska, the Far East and Asia.

Hodgson-Greene-Haldeman Shipyard Bought by Long Beach Marine Repair Company

A new name has come into being in Long Beach with the purchase of the former Hodgson-Greene-Haldeman Shipyard by three partners. The name is LONG BEACH MARINE REPAIR COMPANY, and is a California corporation; the three partners are David F. Maxwell, who is president; George A. Robinson, vice president; and Frank L. Mansuy, secretary-treasurer.

H-G-H built ten tuna clippers, and Long Beach Marine will carry on the same work, plus any small craft up to 150 feet. The new yard plans also to do dockside repair and voyage repair. Long Beach Marine Repair Company has purchased all remaining buildings, including warehouses and marine railways, and will be able to handle drydock work up to capacity of 160 feet, or up to 1,000 tons weight. Since Long Beach Marine has taken over, they have completed repairs on 8 ships, as well as 62 other marine jobs.

Maxwell hails from Washington where he gained his vast experience in welding and welding equipment. His early career was spent learning construction joiner work and woodworking. He was for three years a letterman at Loyola College in football. He first worked for the Lake

THE OWNERS OF LONG BEACH MARINE REPAIR COMPANY

Left to right: Frank L. Mansuy, secretary-treasurer; David F. Maxwell, president; George A. Robinson, vice president.

Seen in the background is the Flying Kate, which has just recently completed 12,000 miles in the Arctic, and which was used for location as the killer boat in the new picture "Harpoon." Repairs to the Flying Kate will be from the keel shoe on up.

Union Drydock Company in Seattle, then went into business in Long Beach, in a machine shop with his father. He worked there for five years before going with Hodgson-Greene-Haldeman in 1942 as shop foreman. His next job with H-G-H was mechanical superintendent, after which he went from superintendent of repairs to general superintendent of all new construction and repairs. During the entire war, he worked on Army, Navy and W. S. A. vessels.

The vice president of the new firm, George A. Robinson, comes from an old shipping family. His father is now an official of the California Ship Service Company. Robinson is a mighty well-known figure about Los Angeles-Long Beach Harbor, and was September Port Engineer of the Month in Pacific Marine Review.

Frank L. Mansuy, as secretary-treasurer, will handle the office detail as he has a background of experience as general manager under H-G-H, and was for three years comptroller for Calship. Before joining Calship, he spent ten years in public practice in Washington, D. C., as a C.P.A.

The Long Beach Marine Repair Company should have some mighty successful years ahead, since not only is the yard located for easy accessibility to Long Beach Harbor, but it has behind it the excellent background and experience of its three young and energetic new owners.

U. S. Lines Announces Changes

Donald V. Briggs, formerly district passenger manager at San Francisco, has been appointed Pacific Coast passenger manager at San Francisco.

William P. Burns, who had been assigned to the Washington office, has been appointed assistant to Briggs.

Below: Donald V. Briggs
Lower right: William P. Burns

International Paint Company (California) Elects George A. Horton Jr.

At the meeting of the Board of Directors following the annual meeting of the stockholders of International Paint Company (California) Inc., George A. Horton, Jr., was elected vice president.

Horton joined the company in New York in October, 1945, upon completion of four years of Navy duty and spent some time studying in the laboratory at the New Jersey plant, learning the know-how of paint manufacturing before coming to the San Francisco factory in March, 1946. Here again he spent some time in the factory, working with the chemists. A little over a year ago he joined forces with the late Fred Shingle, as his assistant, in drydock work and the soliciting of marine business. He has been a director and general sales manager for some time, and retains these duties in his new position.

George A. Horton, Jr.

Wm. F. Horn is Sperry Western Manager

William F. Horn has been appointed manager of the Pacific Central District of the Sperry Gyroscope Company, announces George S. Starke, vice president and general sales manager. He succeeds J. F. McConkey who has left the company.

Horn is a native of Islip, Long Island, New York. In 1930 he joined Sperry as a service engineer. He became a marine sales engineer in 1938, and in 1941 moved to San Francisco where he advanced to assistant district manager in 1944. Before joining Sperry, Horn attended Pratt Institute in Brooklyn and served four years in the Navy.

The district office is located at 525 8th Street, San Francisco. From this point Sperry serves northern California, northern Nevada, Utah, Wyoming, Colorado and Hawaii. Horn's residence is at 1559 43rd Avenue, San Francisco.

John MacNichol Appointed by Pacific-Marine Supply Company

The Pacific Marine Supply Co., Seattle, pioneer west coast and Alaska marine supply firm, announces that John I. MacNichol has rejoined the company as manager of their engine department.

Prior to his naval service during the war, MacNichol had been with the Pacific Marine Supply Co. in the engine department and the fire-fighting division. His past two years as marine engine salesman (diesel and gas), covering the coast and Puget Sound area from Blaine to Grays Harbor, have given him a wide acquaintance among boatbuilders, fishermen, canners and others connected with the marine trade in this area.

In addition to Universal 100% Marine Motors, which Pacific Marine Supply has handled in the Northwest and Alaska for over 25 years, the engine department distributes such well-known marine lines as Bendix Marine Depth Sounders, Goodrich Cutless Rubber Bearings, Champion Spark Plugs and a representative line of equally familiar marine accessories required by both commercial and pleasure boat owners and operators.

William F. Horn

Moran Joins Interocean

A. A. (Andy) Moran, who has been prominent in Pacific Coast Shipping for many years, has been appointed Vice President of Interocean Steamship Corporation as of January 1, 1948. His headquarters will be at San Francisco.

Moran has had a colorful and active career, his most extensive experience being in the Oriental and other offshore trades, where between 1918 and 1927 he was Freight Traffic Manager for the Dollar Lines. As such he was instrumental in promoting a round-the-world service based on fixed sailing dates from each port of call which at that time was a unique feature and contributed much to the success of that pioneer venture which later developed into what is now the American President Lines.

From 1942, all through the war, Moran was Manager of the Port of Redwood City, located at the most southerly part of San Francisco Bay where he developed a modern marine terminal which was selected by the Navy as a center for shipment of vast quantities of packaged petroleum products required in the Pacific Island operations. His love for actual steamship operations has lured him back to California Street, the hub of Pacific Coast shipping, and by coincidence he will be located in the same building where he previously spent so many years.

Moran will participate in the Interocean management and activities for the liner services represented by this Corporation, including coordination of the newly announced extension of the Salen-Skaugen Line to operate between the Atlantic Coast and the Orient via the Panama Canal in addition to their present Pa-

cific Coast-Orient Line now maintained with five new, modern motorships. Other services agented by Interocean are the Interocean Line, inaugurated in 1930 to France, Belgium and Holland; the Knutsen Line to United Kingdom and to West Coast of South America; and the Intercoastal Services of Weyerhaeuser Steamship Co.—Pacific Coast Direct Line, Inc. Andy's many friends will welcome his return to a territory where he is so much at home.

Marine Exchange Elects Officers for 1948

In the recent election of members to serve for a two-year term on the executive committee of the San Francisco Marine Exchange beginning January 1, 1948, the following were chosen:

William E. Cathcart, Vice President-General Mgr., Marine Electric Co.

Thomas J. Cokeley, Vice President-Operations, American President Lines.

J. Harding Jensen, General Terminals Manager, Matson Navigation Company.

A. E. Kihn, Assistant Manager, Marine Dept., Standard Oil Company of California.

Joseph A. Moore, Jr., President, Moore Dry Dock Company.

Roy C. Ward, Vice President, Cosgrove & Company.

Holdover members of the executive committee who will continue to serve throughout 1948 are:

John E. Cushing, President, Matson Navigation Company.

John Parker, President and Manager, American Marine Paint Company.

H. H. Pierson, Traffic Manager, States S. S. Company.

K. C. Tripp, Pacific Coast Manager, Moore-McCormack Lines, Inc.

R. V. Winquist, Vice President in charge Traffic, General S. S. Corp., Ltd.

The members of the executive committee have selected the following officers:

President, A. E. Kihn; 1st Vice President, J. A. Moore, Jr.; 2nd Vice President, K. C. Tripp; 3rd Vice President, R. V. Winquist; Treasurer, J. Harding Jensen.

Babcock & Wilcox to Build High Pressure Test Vessel for Navy

A high pressure test vessel will be built by The Babcock & Wilcox Company for the Navy's Underwater Sound Reference Laboratory, Orlando, Florida. The unit is similar to the one now being completed by the company for the Naval Ordnance Laboratory at White Oak, Maryland, but is designed specifically for Sonar measurements.

The vessel, which has an inside diameter of 100 inches and an overall straight length of 25 feet, 8 inches, will have a 1,000-pound working pressure. It will be fabricated of 4-inch steel having an ultimate tensile strength of 70,000 pounds per square inch. The vessel will weigh approximately 77 tons.

Designed with two quick-opening nozzles for the introduction of test equipment, the unit will be used to test operation of instruments and fittings under actual conditions of pressure and temperature.

We Really Haven't Room for These

An Optimist on Pessimists

If it wasn't for the optimist the pessimist would never know how happy he isn't.

Taxi Driver (to wealthy fare): "Your son tips me more generously than you do, sir."

Fare: "That's quite possible. He has a wealthy father—I haven't."

Some of us could well take a tip from an acrobat. He turns a flop into a success.

Sometimes there are several ways to do a specific job—and yours is only one of them.

Sharp received from his friend MacGreen a letter which bore no stamp, and he had to pay postage due. The letter concluded: "You will be delighted to hear that I am enjoying the best of health, old chap. Yours, MacGreen."

Sharp wrapped a large stone and without paying postage, sent it to MacGreen with the following reply: "This great weight rolled off my mind when I heard the good news."

Admiralty Decisions

(Continued from page 101)

fense either the negligence of a fellow servant, the assumption of risk, or contributory negligence. The court correctly concluded that the employer's failure to secure payment of compensation gives the employee an election to pursue any rights that he deems proper, including the right to bring under the Jones Act an action which by the very words of that act is described as "an action for damages at law." Recent decisions of the Supreme Court of the United States indicate that the exclusive character of the remedies under the Compensation Act could not have been intended to weaken the clause saving the former rights of the employees in instances in which the employer has failed to secure payment of compensation as required by the act.

It might be interesting to know that defendant's motions for directed verdicts under count No. 3 for maintenance, care and cure were granted upon the ground that plaintiff was not entitled to the same benefits that a seaman might enjoy who requires maintenance, care and cure in foreign ports and cities other than his own home, while one such as the plaintiff in this case, would not suffer any of those difficulties and therefore would not and should not receive maintenance, care and cure. Justice Cardoza, when he was sitting on the New York Court of Appeals in the year 1928, indicated that it would be highly improper to provide a stevedore with maintenance, cure and wages in addition to his damages, because of the nature of his employment.

Man Overboard

In a case entitled *Cappy*, decided by the United States Circuit Court of Appeals, Sixth Circuit, in which Gene C. Hutchinson, owner of the *Cappy*, petitioned for exoneration from or limitation of liability, and in which the executrix of the estate of the man who fell overboard joined as a damage claimant, the question of the rights and liabilities of an owner of a pleasure yacht are reviewed, and the rights of the parties appropriately decided.

On a September afternoon in the year 1943, Mr. Hutchinson, the owner of the pleasure cabin cruiser *Cappy*, invited Messrs. Dickie, Barry and Smith to accompany him on a pleasure cruise on Lake Erie. During the the cruise, Dickie was drowned. Hutchinson sought by a petition for limitation, which is, by way of explanation, a right afforded under the admiralty law which permits a shipowner, provided he can prove his vessel seaworthy prior to the accident or damage, to turn over his ship through the mechanics of court proceedings, to the claimants, and thereby be released from any personal liability regardless of the size or total of the claims. The court denied the Hutchinson claim for limitation of liability and found that Dickie lost his life by drowning through the fault and negligence of Hutchinson, and therefore concluded that the executrix was entitled to the sum of thirty thousand dollars and costs. The facts, briefly stated, are as follows:

Hutchinson, whom I will refer to hereafter as Petitioner, met the decedent at a restaurant in downtown Cleveland and invited him and two other men to accompany him on a cruise. They had a number of drinks before they reached the boat. However, they finally left the Lakeside Yacht Club and proceeded out of the harbor entrance into the open lake. The boat rolled considerably due to a northeast wind and a running sea. Decedent was sitting in the cockpit in the stern of the boat and about a half mile out, Petitioner decided to head for a particular lagoon area, at which time it was noticed that decedent had disappeared over the *Cappy's* side. The petitioner was a rather young man. However, he was burdened by a steel brace on his body which restricted his movements. Prior to the time decedent went overboard, the petitioner had removed the brace and was operating the controls of the *Cappy* without its support. The other man on the boat was an elderly person who was hard of hearing and could not swim. The petition to limit liability was denied on the ground that the cruiser *Cappy* was unseaworthy in that *it was not fully manned* on the particular voyage because of the inadequacy of petitioner and the other gentleman along to function as a competent crew.

The Circuit Court reviewed the evidence in respect to the efforts of the petitioner to rescue the decedent after it was discovered that he was overboard and in the water, even though the lower court had found by express findings that the efforts which were made were inadequate and therefore negligent. The Circuit Court was impressed with the argument that there was no evidence that the decedent was caused to disappear from the cruiser by any act of negligence by the person who was steering the cruiser at the time, or by any defect of the construction of the cruiser. The Circuit Court, in reviewing the evidence, found that petitioner, as soon as he learned that decedent was overboard, immediately reversed the motors, looked back and within a matter of a few minutes, he saw a person's head on the surface of the water. He backed the *Cappy* full speed astern and two life rings were thrown into the water for decedent's use. The rings fell within a few feet of the decedent who, if he saw them, paid no attention to either. As the cruiser approached decedent, he disappeared under the water. The Circuit Court rightly concluded that it was not negligent for petitioner to act in the manner in which he did. As one of the witnesses said, when one is dealing with a tragedy, an emergency, the cry "Man Overboard" and the excitement incident thereto, any action taken is intended to be effective, where as here there was complete absence of opportunity for mature consideration. It becomes more apparent as the Circuit Court reviews the evidence, that petitioner did everything that any reasonable person would have done under similar and like conditions, and there was no showing that anything he did or left undone, caused his efforts at rescue to fail. It is quite possible, as many of the expert witnesses for the damage claimant contended, that there were many more effective ways of proceeding to rescue a drowning man. However, such methods and procedures are not necessarily in one's mind when confronted with a situation such as that described here. Even though each of the men aboard had quite a few drinks before they left the dock landing, there was no evidence that drinking interfered in any way with the manipulation and operation of the boat. The same is true of the facts that petitioner had removed his body brace, which reduced his support to some extent, but did not restrict his acts to rescue decedent.

The Circuit Court found that the decree in favor of the damage claimant had no substantial support in the evidence and rested upon mere speculation and conjecture. The court recognized the correctness of the rule that due weight should be accorded to the findings and judgment of the lower court, but pointed out that where they appeared to be in error, the Circuit Court could not be bound by them.

Development of Square Root

(Continued from page 108)

line to C, making BC equal to unity in the scale you are using. With a compass, construct a semicircle on AC. Erect a perpendicular at B, giving BS equal to the desired root. The proof is based on the proposition that any triangle constructed within a semicircle, having a diameter as a side and the other sides meeting in the circumference, is a right triangle. If so, then the perpendicular BS forms two right triangles which are similar. And the sides of similar triangles have equal ratios. The remainder of the proof is shown in the figure. This would not be a very accurate method, particularly for very large numbers.

Our next article will deal with an analysis of the horsepower of the engine formula and its variations.

The Earth's Magnetism and its Effect on the Ship and Compass

(Continued from page 106)

the magnetic equator, while the intensity in vertical hard iron is greater if the vessel is built near the poles.

The *Polarity, Line of Demarcation* and *Distribution* of red and blue magnetism in the vertical hard iron of the vessel is also dependent on the magnetic latitude of the vessel while under construction. The poles of sub-permanent magnetism of the vessel are assumed to be in about the central point of either extremity of the vessel and in line with the magnetic meridians which pass through the vessel. The Line of Demarcation of sub-permanent magnetism is at right angles to these meridians and midway between the poles. Figure No. 3 will illustrate the distribution of red and blue magnetism in the horizontal and vertical hard iron of a vessel built on a N. E. magnetic heading in a magnetic latitude of about 60° north (near San Diego).

The intensity of sub-permanent magnetism diminishes quite rapidly at first after launching, then diminishes very slowly until the vessel is settled down (sometimes taking as long as two years) and then remains steady unless the polarity is changed by some unusual occurrence, such as being struck by lightning, having a severe fire, etc. Sub-permanent magnetism is the chief contributor to, but not the only cause of, semi-circular deviation. Semi-circular deviation which is due to sub-permanent magnetism is compensated for by means of fore and aft and athwartship permanent magnets.

Coefficients B and *C* are coefficients of semi-circular deviation due to sub-permanent magnetism.

Coefficient B is the name given to the disturbing force in the fore and aft line of the vessel. It has its maximum effect on east or west magnetic headings.

Coefficient C is the name given to the disturbing force of the athwartship component and has its maximum effect while the vessel is on north or south magnetic headings.

Transient magnetism and practical compensation will be discussed in a future issue.

High Pressure and High Temperature Steam in Naval and Merchant Vessels

(Continued from page 79)

trolled by the rate of firing of the superheater furnace.

The pressure and temperature conditions for the *Somers* class destroyers, 600 psi and 850° F, were later adopted for all steam powered combat ships in our Navy.

Boilers of this general design, but of different size, were installed in 10 destroyers of the *Benham* class, in all 12 of the *Sims* class, as well as in the first classes of our modern battleships — *North Carolina, Washington, South Dakota,* and *Massachusetts.* All of these ships had excellent service records during the war.

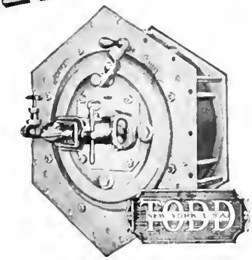
The *Gleaves* type of destroyer, designed in 1938 incorporated still another advance of superheat-control integral with the boiler. These boilers are the Babcock & Wilcox Single-Uptake, Controlled Superheat Design (Fig.7). They are similar to the type installed on the *Somers,* but in the *Gleaves* class the furnace is divided by means of a stud-tube partition wall which extends only for a portion of the height of the furnace. The superheater is installed between the superheater and saturated furnaces and is suitably screened from the radiant heat of the superheater furnace. The gases of combustion from the superheater furnace pass across the superheater and through an opening in the top portion of the division wall tubes into the saturated furnace. The gases then pass through the boiler generating bank to the economizer, and finally to the uptake. The saturated steam is passed through the superheater where it is superheated to any degree desired by controlling the firing in the superheater furnace. By comparing Figures 6 and 7 it will be noted that this later design has only one gas outlet—a feature which was extremely desirable in view of the increasingly congested space conditions in all classes of ships.

Practically all subsequent combat ships were equipped with the same general design of boiler as installed in the *Gleaves.* They are installed in the destroyers of the outstanding *Fletcher* class; in such famous battleships as the *Iowa* and *Missouri* and their sisters; in cruisers of all types, including the giants of the *Alaska* class; in the renowned aircraft carriers of the *Essex* class and in the super-carriers *Midway, Coral Sea,* and *Franklin D. Roosevelt*—largest warships in the world. The boilers in the *Midway* class give some idea of the meaning of advances since the early days of steam power in the Navy. They are capable of generating enough power for a city with 1,000,000 population, and to feed them with fuel, the bunkers carry enough oil to heat 3,000 average sized homes for one year.

Data on performance of modern naval boilers has not been released by the Navy Department. However, it can be safely assumed that they represent remarkable advances over those in previous eras, and over those in other navies of the world. The high level of design and construction that went into all the machinery of these warships is typified by the record of the aircraft carrier *Essex,* which covered 250,000 miles of ocean, averaging 240 miles a day between the time of commissioning and the end of the war (including the very few days she spent in port). This is more mileage than would normally be expected in the entire life time of a capital fighting ship. Yet during that entire period her machinery required only routine maintenance.

What the future holds in the way of higher pressures and temperatures and new designs of boilers is, of course, a closely guarded secret. Published reports have been made on one experimental installation on the U.S.S. *Dahlgren,* using a B&W forced-circulation design of boiler generating steam at 1300 psi and 925°F. Other experimental installations will undoubtedly be made. The Navy, having achieved brilliant successes in World War II as a result of foresight and long-range planning, will not rest upon its oars.

(Part II, Merchant Ships, wil appear in February).



London Insurance Market Adequate for Postwar

(Continued from page 102)

credit from insurance to the balance of payments. How much of it comes from marine insurance one can only hazard a guess, but perhaps we might in a peak year claim half. Be that as it may, what I found was very interesting and significant. I have compared the last three prewar years 1936-1938 with the figures today as they deal with invisible exports as a whole. The total for those prewar years from such sources as overseas investments, shipping, banking, and insurance gives an average of some £352,000,000 a year. Assuming that our £20,000,000 contribution from insurance is correct, that means that we then contributed rather less than 6 per cent of the total.

"For this year, however, the total of our invisible exports is expected to be only £75,000,000. Again on the assumption that the insurance contribution should be around £20,000,000, it means that our share has gone up to rather more than 26 per cent. How necessary it is, therefore, that we should ensure by every means in our power that that proportion is maintained."

Broker's Place in the Industry

The broker's usefulness to the insurance industry has been divided by Sir Philip d'Ambrumenil, chairman of Lloyd's into four main parts: (1) the developing of insurance; (2) the stimulation of competition; (3) the value of his expert knowledge; and (4) he was not tied to a group or groups of insurers. Sir Philip was speaking at a meeting of the Insurance Institute of London, his subject being: "Is the insurance broker a necessary part of the insurance industry?" It was not reasonable, he said, to expect that every prospective insured could know the best market for a particular insurance, nor was it reasonable to think that, unless he were well versed in insurance, he could easily present his case. The broker, with his expert knowledge, supplied that need. Furthermore, there would be claims on a certain number of policies, some involving dispute; the expert knowledge of the broker and his ability to argue the case reasonably often led to a settlement which might otherwise have involved litigation and bad feeling. The fact that the broker was not tied to a group or groups of insurers was of great advantage, because the freer he was to choose the insurers, the better it was for the insured.

BOOK REVIEW

LIVES OF THE LINERS, by Frank O. Braynard, Assistant Director of the Bureau of Information of the American Merchant Marine Institute; published by Cornell Maritime Press. Price \$3.75; 224 pages; 6" x 9¼".

Vastly interesting, highly entertaining is this account of the lives of the world's great ocean vessels. The biographies of practically all of the large passenger steamers of the last two decades are covered, as well as a great many of the smaller ones. The book is divided into four parts: Superliners, which covers the old Mauretania, Leviathan, Normandie, Queens Mary and Elizabeth, Conte de Savoia, and others; Express Liners, the new Mauretania, Statendam, Roma, and others; Mail Liners of the World, the ships which make up the largest group of passenger vessels in operation; smaller ships—mercy ships, cruise ships, skimming saucers. Well worth the reading!

Heavy Duty Chain Drives for Marine Propulsion Service

(Continued from page 89)

towing ability and hydraulic efficiency mean dollars and cents to the owner.

While there are undoubtedly many arguments for the large slow-speed type of diesel engine for vessels of this kind, a good deal of interest is being shown by designers of commercial craft in the lighter medium-speed diesels, and especially in the compounding of two or more of these engines for single-screw operation.

There are several reasons for this interest, as follows:

1. Capital outlay is less per unit of power.
2. A smaller engine room allows more space for cargo or crew's quarters.
3. Engine overhaul is possible without laying up the ship.
4. Lighter engines allow of lighter hull construction.
5. For light running, one engine may be used at a time with enhanced economy.

All of these advantages of course may be inherent in a gear-driven multiple-engined vessel.

It will often be found, however, that gear drives of suitable ratio, unless constructed with expensive, inefficient idlers, will require that the engines be placed so near together that proper provision for operation and maintenance cannot be made.

Chain drives, on the other hand, operate best with the sprocket centers spaced at a distance roughly equivalent to 1 or 2 diam. of the largest sprocket.

This relatively wide spacing of centers allows engine spacing in the ship which will provide the best accessibility, balance, and arrangement of accessory equipment.

Chain drives also, because of their less-exacting requirements for accuracy of center distance and housing structural rigidity, lend themselves better than gear drives to economical "tailor-made" design and construction. By this it is not to be construed that a marine drive can be successful if built to "backyard" or "cob-house" construction standards.

Of equal importance to accurate chains and sprockets is a base or housing of good design, adequate shafting and bearings, and fitting and assembly workmanship consistent with the requirements of heavy-duty equipment.

One of the earliest installations of a marine chain drive was in the conversion of an old 70-ft. steam tug to diesel power, Fig. 11. Removal of the boiler and engine left ample room for installation of a pair of 165-hp 800-rpm engines with built-in 2-to-1 reduction gears. A 2-to1-ratio chain drive, using two 1¾-in. pitch, 3-strand chains, compound the engines to the propeller shaft which swung the original 76 in. wheel at 200 rpm.

This little vessel after conversion easily outpulled a larger tug in the same fleet which was powered by a single 400-hp German-made engine but which swung a smaller propeller at higher speed. Operating costs over a 2-year period showed a substantial saving over steam and with fuel economy comparable to other diesel tugs in the fleet.

Another interesting application for chain drives is in connection with adjustable-pitch propellers. Here the fluid supply to the servomotor and the control rod, which limits the propeller-blade movement, are carried through the hollow shaft of the chain transmission.

Reversal from full speed forward to full speed astern in as little as 5 seconds, as well as propeller-pitch adjustment for all operating conditions are possible with this arrangement.

Conclusion

Future development of the marine chain drive will probably depend to a considerable extent upon the economical status of the multiple-engine power plant as compared to the more conventional single-engine layout for small and medium vessels.

During the three years that most of the chain-driven boats have been in operation accurate operating data have undoubtedly been accumulated, and although conditions make this unavailable at the present time, it is believed that the results will show many cost-saving advantages for both dual engines and chain drives.

Availability of the drives and standardization of units will come rapidly once the requirements of power, speed range, and center distances are more clearly established.

With the Naval Architects and Marine Engineers

(Continued from page 84)

the service requires, so as to assure passenger comfort in all climates; if we build them in such a way as to eliminate the possibility of large-scale fires; if we furnish and decorate them in quiet, simple good taste; and if we house them in a seaworthy structure which is designed specifically to convey the impression of smart, clean, up-to-dateness; then we shall have made available to the public a traveling experience that no other medium of transportation can duplicate. And I doubt very much that the passenger agents of our various lines shall suffer for lack of something to do."

	Original Arrangement Number	Original Arrangement % of total	Re-arrangement Number	Re-arrangement % of total
Total outside rooms	58	84	70	82
Total air-light rooms	0	0	16	18
Total inside rooms	11	16	0	0
Total rooms	69	100	86	100
Total 3 pass. rms. (2 floor beds, 1 sofa bed)	8		32	
Total 3 pass. rms. (2 floor beds, 1 upper)	52		28	
Total 2 pass. rms. (2 floor beds)	6		6	
Total 2 pass. rms. (1 floor bed, 1 upper)	3		20	
Total floor beds (inc sofa beds)	143		184	
Total uppers	55		48	
Total passengers	198		232	
Total bathtubs	30		48	
Total showers only	28		38	
Total lavatories	58		86	
Total water closets	58		86	

Tuna Clipper Safety Requirements

(Continued from page 104)

effort required to heave the fish over the rail is reduced to a minimum. Inevitably a wave comes over the top of the rail and floods the deck. The water has to pass down through the fish on deck—through the grating and out the scuppers if there are no large freeing ports to get rid of it. As a substitute it was decided:

> If the owners elect not to install freeing ports, scuppers must be provided with an area of at least 25% greater that the combined required scupper and freeing port area.

This produced the best arrangement of all, which is practically a continuous opening all fore and aft through the bulwark, about 7″ high fitted with closing flappers. If water came on deck it had a chance to get overboard

and when a sea washed against the outside of the bulwark the flapper closed and kept the deck dry.

The reason for omitting all openings aft of a point 14 feet from the stern is that the wave formation on most of the boats is such that the water comes aboard through the scuppers and openings instead of running off the deck as intended.

No. 6 Freeing Ports

The standard freeing ports are 12″ x 12″ but may be made any equivalent area. The following freeing ports are required;

Boats 125 feet long over all and larger—Six freeing ports on each side.

Boats 100 to 125 feet long over all—Five freeing ports on each side.

Boats under 100 feet long over all—Four freeing ports on each side, not less than 8″x9″.

Some vessels are fitted with a tonnage door between the forward end of the bait boxes and the ship's side. Where this is done;

Where a vessel is fitted with a space on the Main Deck enclosed by watertight doors abreast the Bait Boxes and freeing ports are made so they will open with not more than 4″ of water on deck at the deepest place, the freeing ports can be used as scuppers in the enclosed space.

What the fishermen complain about is that the blood and gurry run off the deck and contaminate the water where they are fishing. This causes the fish to leave and spoils the fishing. The crown of beam of the fishing boats is usually 6″ to 10″ and if the blood and gurry are allowed to accumulate to a maximum depth of 4″ it will run to the lowest part of the sheer away from the fishing operation.

Within the last 18 months the fishermen have accepted the idea that the freeing ports are better than the scuppers and several of the boats have had the scuppers closed and freeing ports cut in the bulwark instead. To get adequate area of freeing ports it was found better to adopt 1¼ square feet instead of 1 square foot as a basis, as the available space along the bulwark was taken up with other features relating to the fishing operation.

Closing the scuppers and substituting freeing ports;

Boats 125 feet long over all and larger—14 freeing ports 1 square foot each or 11 freeing ports 1¼ square feet each.

Boats 100 to 125 feet long over all—Eleven freeing ports 1 square foot each or Nine freeing ports 1¼ square feet each.

Boats under 100 feet long over all—Ten freeing ports not less than 8″ x 9″ or Five freeing ports 12″ x 12″.

It is necessary to have one or two drainage holes to get rid of water spilled on deck but these serve only for the purpose of drainage.

Doors To The Engine Room

In addition to the facilities for ridding the deck of water the subject that has been discussed most often and at great length is the entrance to the engine room. Many proposals have been made to improve the door situation but to no avail and apparently the solution is as far away as ever.

The real troubles are lack of ventilation and laziness. Insufficient ventilation serves as an excuse for leaving the doors open and there seems to be no way to get the crew to pass through the door and close it after them.

Springs were tried but they were too cheap and were a failure. There are two good door-closers on the market now which were in short supply previously. One has an arm about 3 feet long that is actuated by a vertical coil spring, generally used on refrigerator doors. It is excellent for the purpose, well made and rugged; it also has the advantage of being independent of the hinges of the door itself. The other was developed during World War II and substitutes a Hydro-Hinge in place of the ordinary common hinge on the door. The Hydro-Hinge has a heavy spring in a cartridge that closes the door.

The losses due to the doors being open, permitting water to go below have been out of all reason. Not long ago a delegation waited on the underwriters to get them to accept the risk of the doors being open and the ink was hardly dry on the bulletin when one of the tuna boats ran on a sand bank in broad daylight, leaned over on her bilge and flooded the engine room through the open door. Not a thing was physically damaged but the salt water ruined all motors and electric work.

The wing athwartship doors are now required to be watertight, which means that they must be steel on both wood and steel vessels. However, there is quite an advantage in making the wing atwartship door of steel even on the wood vessels because it is mounted on a large steel plate that is bolted to a heavy angle at the edges and the whole plate is removed when it is desired to send one of the pieces of machinery to the shop for repairs.

No. 7 Door in After End of House

Where a door leading to the engine hatch is in the after end of the house adjacent to where fish cargo is worked, the sill to be at least 24″ above the deck.

This arrangement used to be quite common but is seldom used now. The galley and mess room is in the after end of the house and some of the boats had the entrance to the engine room just inside the galley door. The fish on deck would get through the door and down into the engine room and there was also constant danger of the men falling into the hatch.

No. 8 Door at Raised Deck

Where a vessel has a raised portion at the forward end of the main deck, the door in the side of the house to be at least 8″ forward of the after end of the raised deck. The door to be in halves and the sill to be at least 8″ high.

At one time it was customary for the door to the engine room to be placed in the side of the house on the main deck just aft of the forecastle which was raised 18″ to 24″ above the main deck. The bulwark was at the height of the forecastle or possibly 8″ above it.

Especially when the boat is going out light and is down by the head a little—a sea breaking aboard runs forward, hits against the break of the forecastle and jumps through the door down into the engine room. The loss of a new boat together with the lives of the owners helped to have this changed.

No. 9 Door in the Side of the House

Where a vessel has a continuous flush deck fore and aft, the door in the side of the house leading to the engine hatch to have a sill at least 12″ high.

The trouble here was that the sill of the door was so much lower than the bulwark that water rushing along the deck invaded the door to the engine room.

To be continued in February PACIFIC MARINE REVIEW

Proposed European Recovery Program The Marshall Plan

(Continued from page 93)

TYPE 3

By private agencies to the greatest possible extent.

VII—Section I of Loan Control and Administration

A—IN THE UNITED STATES—THE U. S. DOMESTIC CORPORATION

By a non-partisan Domestic Corporation to be established by Congress to control and administer the European Recovery Program.

The President of this Domestic Corporation, and the majority of the Directors, to be outstanding leaders of United States industry.

The members of the Board of Directors to be nominated by the President of the United States and confirmed by the Senate.

The Board of Directors to be accountable to the Congress of the United States.

B—IN THE SIXTEEN COUNTRIES OF EUROPE—THE EUROPEAN BOARDS OF TRUSTEES

Country-by-country local Board of Trustees to be established with majority control vested in representatives appointed by and responsible to the United States Domestic Corporation. Minority members to be appointed by the respective recipient countries.

This Board of Trustees should recommend and, if subsequently approved, administer, through delegation, dollar loans for raw materials and capital goods as may be extended either through the Export-Import Bank or World Bank.

VIII—Section II of Loan Control and Administration

A—THE LENDER'S TERMS—PRE-ACCORD UNDERSTANDINGS

The United States is willing to extend material and financial help to the countries of Western Europe, providing the United States is permitted, and the governments of recipient countries facilitate, the making of pre-accord understandings in respect to the administration and control of any grants or loans to the end that any aid extended is used for the purpose intended, in the manner intended, and with the benefit anticipated.

The United States of America should insist that pre-accord agreements stipulate the right of United States nationals to handle the administration and control of loans, on a sound business basis—without being charged with economic or political imperialism.

B—THE BORROWER'S PENALTIES—FOR NON-FULFILLMENT OF TERMS

The United States must assume the role of a prudent lender and the recipients that of honest borrowers, so that failure properly to use, efficiently to administer aid granted or to attain benefits anticipated will, and must be, considered as cause for mandatory temporary or final suspension of that part of the program.

IX—Section III of Loan Control and Administration

A—ADDITIONAL POLICIES GOVERNING LOANS OR GRANTS—ECONOMIC

The effect of any and all aid requested should be evaluated and reviewed, before grant or commitment on our part, for its impact upon our own economy, under the criterion that it is of supreme importance to maintain the economy of the United States strong, virile, and expanding if we are to fulfill our destiny in a disrupted and weakened world economy.

Aid for economic improvement should be, insofar as possible, direct from industry to industry rather than from government to government.

European business should welcome and American business under private contract should extend to the fullest practicable degree manufacturing and management technique and know-how in order that European productivity can create new wealth.

B—ADDITIONAL POLICIES GOVERNING LOANS OR GRANTS—FISCAL

Realistic fiscal and monetary policies, essential to a sound currency and to recovery of production and trade, are obviously necessary if the aid program is to be effective. European countries must permit their currencies to seek their true value as expressed in terms of goods and services.

C—ADDITIONAL POLICIES GOVERNING LOANS OR GRANTS—POLITICAL

The United States of America is not interested in imposing its political or social system on any country or region in the world. Conversely, it is determined that no other nation shall impose its system or idealogy on ours.

Consequently, whatever the political idealogy of the recipient nations, or their manifestation in practice, so long as the essential human freedoms, as set forth in our Bill of Rights, are preserved, the United States of America should carry out its commitments under any aid program agreed upon.

To achieve the maximum success and consistency with American foreign policy, there should be the closest collaboration between the new U. S. corporation, the Department of State, the Export-Import Bank, other interested U. S. Government departments and agencies, as well as international organizations in which the United States has official participation, such as the World Bank and the Monetary Fund.

X—Recommendations Concerning Restoration of Economic Life of Western Germany

That it is in our and European self-interest to restore the economic life of Western Germany without permitting re-establishment of a war potential.

Economic affairs should be placed under a Civilian Economic Board for the Restoration of German Productivity.

The Board should consist of experienced United States citizens in the realm of finance, manufacturing, agriculture, labor, trade and commerce.

That rehabilitation loans, self-liquidating in dollars, be made aavilable in sufficient amounts to do the job so evidently necessary for the peace and well-being of Europe and the world.

That further dismantling of German productive and manufacturing facilities be held in suspense pending execution of above recommendations.

Address at Banquet Aboard President Cleveland

(Continued from page 97)

ting over his Subsidy Bill which was then before Congress. Naturally, he being my boss, I said that I would do as he directed but that my heart could not be in my work because I was opposed to subsidies. He replied in a rather interesting manner by saying that he, too, had always been and still was, opposed to ship subsidies, but, he

(Please turn to page 140)

Development of Ship Forms

(Continued from page 92)

as the 'Admiralty displacement constant'."

The constants used, given in ordinary units of measurement, are:

1. The "speed constant" $K = \frac{V}{D^{1/6}} \times 0.5834$
2. The "resistance constant"
$$C = \frac{R}{D^{2/3}V^2} \times 2938 = \frac{E.H.P.}{D^{2/3}V^3} \times 427.1$$
3. The "length constant" $M = \frac{L}{D^{1/3}} \times 0.3057$
4. The "length-speed constant" $L = \frac{V}{\sqrt{L}} \times 1.0552$
5. The "skin constant" $S = \frac{S}{D^{2/3}} \times 0.09346$

Where V=speed in knots
R=resistance in tons in salt water
D=displacement in tons in salt water
L=length in feet between perpendiculars
S=wetted skin area in square feet.

The Froudes also investigated the character of the waves created by a ship passing through the water and concluded that the bow did not produce a solitary wave of translation in accordance with Scott Russell's theory. They found that the ship created two classifications of waves—those produced by the advance of the bow and those caused by the streamline motions of the stern. Each of these may be subdivided into a diverging series which trail aft and a transverse series whose crests are at right angles to direction of motion.

A series of models having varying length of parallel middlebody but the same length and forms of entrances and runs were tested and it was found that up to a certain speed (that appropriate to the length of run as determined by Russell's theory) the wave-making resistance was nearly constant for all models. Above that speed the wave-making resistance varied considerably as the total lengths of the models changed. The Froude's concluded that for any given ship "The height of the waves made, and the amount of the resistance caused will be at the maximum or minimum according as the crests of the bow-wave series coincide with the crests or troughs of the natural stern-wave series . . . In either of these two cases the crest of the resultant wave coincides with the crest of the larger of the two components, while, if the crests of one series fall on the slopes of the other, the resultant crest position will be a compromise between the crest position of the components, though nearer to the larger of the two."

Wave-making resistance is affected by a number of considerations. The height of the bow-wave depends on the speed of a ship and the form of the entrance while the height at the stern of the transverse series of waves caused by the bow depends on the length of the ship. In like manner the form of the stern and the speed affect the stern series of waves and the point of coincidence.

Regarding the general shape of the ends of a ship R. E. Froude noted the following: "It is a reasonable inference . . . that the wave-making features of a ship will operate more effectively to make short waves if their displacement is disposed broadwise rather than deepwise; and more effectively to make long waves if it be disposed deepwise rather than broadwise. Now, the diverging waves being necessarily much shorter than the transverse waves, we see that flaring-out the end sections of a ship, or increasing the ratio of breadth to depth, will caeteris paribus tend to increase the resistance due to diverging waves and diminish that due to transverse waves: while giving U-sections or increasing ration of depth to breadth will have the opposite effect. Again it is worth noticing that the experiments have shown that, as a rule, moderately U-shaped sections are good for the forebody, and comparatively V-shaped sections for the after-body. This would seem to show that in the wave-making tendency of the after-body the diverging wave element is less formidable than in that of the fore-body, and this inference corresponds with the fact that the stern diverging-wave series is visibly less marked than that of the bow."

Since the model towing tanks used by the Froudes at Torquay and Haslar were supported by the British Admiralty it was only natural that the majority of the models tested were of fine-lined vessels suitable for naval service. The same can be said of the early tanks in other countries so that conclusions drawn from such tests could not be applied directly to the slow merchant ships of the period. The first and only private establishment for many years was that built by Denny of Dumbarton in 1881. The majority of naval architects still used the Admiralty coefficient or some combination of the works of Russell and Rankine for determining the form and resistance of their new ships. In addition, there were many proposed formulae for determining the resistance based on the dimensions of a ship with a suitable coefficient.

The authors of some of these approximate formulae ignored the work of the Froudes showing the difference between the frictional and residuary resistance and at-

tempted to obtain the total resistance by a complicated relationship of dimensions and areas with a variable coefficient. Other formulae for residual resistance only failed to follow the law of comparison, hence calculated results versus test results showed agreement at one speed only. Such formulae usually were applicable to a particular type of vessel with which the originators happened to be working. A formulae for residuary resistance given by D. W. Taylor about 1895 for speeds where $\frac{V^2}{L}$ is less than 1.2 is:

$$\text{Residuary resistance in lbs.} = \frac{12.5 \; b \; D \; V^4}{L^2}$$

where

b=block coefficient
D=displacement in tons
V=speed in knots
L=length on water-line in feet

In combination with a frictional resistance calculated by the Froude method this formula gave good results.

In practical shipbuilding the last half of the nineteenth century saw the gradual change from paddlewheels to screw propulsion for ocean service, the reduction of sail power on steam vessels, and the general acceptance of first iron and then steel as building materials. Improved engineering knowledge led to larger ships and more powerful machinery. The particulars of some of the famous Atlantic liners of the period follow:

Name	Atlantic	Persia	City of Paris	Oceanic
Date	1850	1856	1866	1871
Owner	Collins	Cunard	Inman	White Star
Material	Wood	Iron	Iron	Iron
Length	282'	360'	346'	420'
Breadth	45'	45'	40'4"	41'
Depth	24'	29'9"	26'2"	31'
Propulsion	Paddle	Paddle	Screw	Screw
I. H. P.	2000	3600	2600	3000
Speed	11¾	12½	13½	14¾

Name	Arizona	Etruria	Kaiser Wilhelm Der Grosse
Date	1879	1885	1897
Owner	Guion	Cunard	N Ger. Lloyd
Material	Iron	Steel	Steel
Length	450'	501.6'	627 4'
Breadth	45'4"	57,2'	66'
Depth	35'7"	38.2' (Hold)	35.8' (Hold)
Propulsion	Screw	Screw	Screw
I. H. P.	6300	14500	28000
Speed	16¼	20	22½

Part III of Mr. Baker's article, entitled "Modern Practice" will appear in the February issue of Pacific Marine Review.

Address at Banquet Aboard President Cleveland

(Continued from page 136)

added, when I learned that one of the biggest maritime nations in the world was so intently interested in defeating the Bill by sending to the steps of our Capitol some trained lobbyists, I decided that to insure an American Merchant Marine at any cost was something I simply had to pursure. Well, as you know, the Subsidy Bill of that period was killed and on other occasions other attempts were made, but always in a veiled manner. When Mr. Roosevelt became President, he decided to call it by its right name and the Subsidy Bill was enacted into law. But I still do not like subsidies. I wonder, if all of us here, and all others (who are shippers or consignees) would think of these things and support our ships come hell or high water, whether we *would require* subsidies.

On the ship operators' side, I would like to mention their responsibilities by briefly reminding them that they are the servants, not the masters, of the trade. By this, I mean that ships are of no value to shippers who have nothing to ship, and one way to have nothing to ship is to have no customers. Yesterday we had customers and today we have some, though not enough. But we cannot keep our present customers and get new ones if the costs of getting our products to them is too high for their pocketbooks. It is well and good to say, provided we are isolationists, that our home economy comes first, but that is like a school boy thinking that when he's learned the multiplication table, and the "goes into's" that he knows all about mathematics. Unless we create and maintain foreign markets, we are sunk at home, and one way to help develop this line of economics is to have sure, efficient and cheap transportation. From time to time, I resent carriers agreeing on this increase and that, without consulting or at least taking into account the person who pays these increases. They are always in the freight rate or the handling charges, and one of these days these charges will be too high and the goods will simply not move. Under such conditions, should we pay subsidies to the ships for NOT carrying goods that they could have carried IF the rates were within reason?

Incidentally, I wonder why we haven't kept in step with labor results. I do not mean that we should revert to slave conditions or to low wages, but I do refer to the intelligent use of our brains, skills and the employment of labor-saving equipment. Sailors use the latest developments aboard ship to make their work easier and more efficient—why not the workers on the docks? I am one of those who believe that eliminating or refusing labor-saving devices is criminal and just as degrading as low wages and long hours.

Some years ago I wrote a Bill that created the Manila Harbor Board, and the other day I got messing around some of the old records. Here is something that may interest some of you who have forgotten. After making numerous changes in the handling of ships and cargoes in Manila, we received this letter:

"The S.S. *President McKinley* of the Admiral Oriental Line arrived at the port of Manila at 6:00 a.m. January 24, 1924 and was berthed at the pier at 7:30 a.m. 4300 tons of import cargo were discharged and 2900 tons of export cargo were laden in 29 actual working hours, or an average of 248 tons per hour. The vessel sailed for port at 5:00 p.m. January 25 (the next day), or 35 hours after her arrival."

Do you wonder why I bring up the point of comparing the improvement in ships and "change," let's call it, in cargo handling—and think of the costs—and the possible elimination of our ships from the seas unless we get a change in the attitude from this member of the team? Perhaps with our new national attitude toward a certain foreign country we might expect some improvements along this line. I am confident that *ONLY with the American* attitude in our labor ranks, will we be able to bring this member of the team into a full working partnership, and very greatly to his advantage.

So, I say to you, the responsibility of the carriers is something that goes beyond their business. The American ship operator, the American producer, whether farm or factory, the American consumer and the American's customer abroad, form the team, and they must work together. But they cannot, without the proper coach and captain. Since I was one of those who helped write the Bill that created the present Maritime Commission, I may be pardoned if I presume to say that that legislation is now obsolete and I recommend bringing it up to date. I wonder if the members of the team I have just mentioned should not get together and sincerely offer some of their experience and talents for such a change in the present laws.

Pacific MARINE REVIEW

FEBRUARY 1948

Pacific Marine Review

. HINES
Publisher

I. DeROCHIE
Assistant Publisher

OUGLAS MacMULLEN
Editor

IXANDER J. DICKIE
Consulting Editor

I. DeROCHIE, Jr.
Assistant Manager

IL FAULKNER
Pacific Coast Advertising Mgr. Los Angeles Office

VID J. DeROCHIE
Assistant Los Angeles

ORGE W. FREIBERGER
Advertising Mgr. San Francisco

Member Audit Bureau of Circulations

bscription rates:

n year, $2.00; two years, 3.l; three years, $5.00; for-g $1.00 additional per year; n copies, 25c.

TABLE OF CONTENTS - - - - - - FEBRUARY, 1948

PUBLISHED AT 500 SANSOME STREET • SAN FRANCISCO 11, CALIFORNIA

LOS ANGELES OFFICE . . . 816 West 5th Street Zone 13. Telephone Michigan 3129

Pacific Marine Review

WHAT IS A SHIP?

AT THE EDGE OF A WYOMING PRAIRIE there once appeared a sign that read, "Choose your rut with care, for you will be in it for the next 500 miles." And that was a long way in those days.

There are many ruts in maritime industry thinking, and there are many who will not climb out. Each of us seems to pick his own rut and seldom even thinks of other branches of the industry. For instance,—the diminishing ship construction, which to many people seems to indicate the end of the world. Just what *is* a ship? Or ship construction?

We do not go along with the idea that ship construction is finished, nor with the idea that ship construction is all that there is to the industry. If some of the governmental S-curves and stop signs and road blocks could be eliminated, there would be a lot more ships. Herbert Hoover stated recently that there have been 162 boards and commissions to investigate the Merchant Marine, all of whom came up with the conclusion that there must be a strong Merchant Marine. The whole industry is in *that* rut. Let's climb out, as the oil people are doing in the tremendous new tanker program that broke almost over night. And as the Navy is doing in its plans for giant carriers and undersea tankers. And just as certain steamship companies are doing as the need for ships generates the spirit and finance needed for independent action. The chartering days may soon be over.

A ship is an important symbol of a mighty industry and of national defense, but to some it is merely a subsidy rut. They do not realize that our war-built ships were obsolete the day they were built. Nor that the subsidies required for the ships that will make possible an American world trade of 15 billion dollars a year are about $\frac{1}{4}$ of 1% of the trade these ships help create. The federal subsidy for *paved roads* is four times as much and for *potatoes* twice as much. Subsidies for ship construction are a cheap way for keeping the country strong. America can afford them.

But we cannot afford to give our ships away or to lend them to other countries to man and sail. Beyond the mere transportation which they provide, there is the matter of employment for our crews, control of cargo routing, and the handling of ship repairs and services. A shipyard worker keeps *six and a half* other Americans at work in other industries in 46 states. Let's not transfer our ship assets to others. This rut of international thinking would lead to poverty and defeat. The easy, beaten path of giving all to avoid dispute is not the American way. Beaten paths are for beaten men.

THE SEATTLE — In Port at Los Angeles

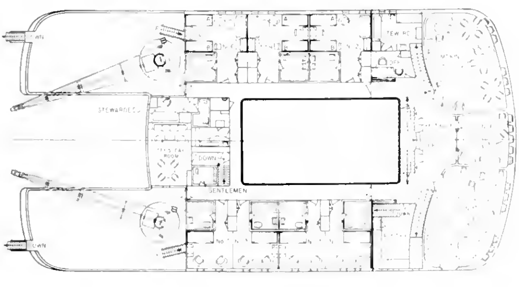
Longitudinal cross-section of the Seattle.

Swedish Motorship *Seattle* *For Pacific Service*

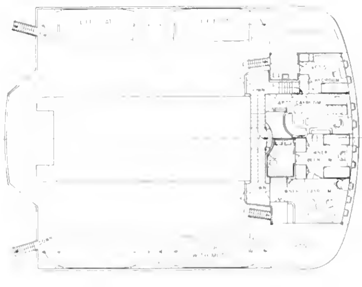
With cargo handling looming as one of the most important elements in ship operation, the industry as a whole has taken a special interest in the performance of the new Johnson Line motorship *Seattle* which visited West Coast ports during January on her maiden voyage from Sweden. She is the first of a series of five fast cargo liners of an almost entirely new type ordered by the company. These vessels, each of 9100 tons d.w., are intended for the Europe-North Pacific service.

The *Seattle*, delivered in November 1947, is being

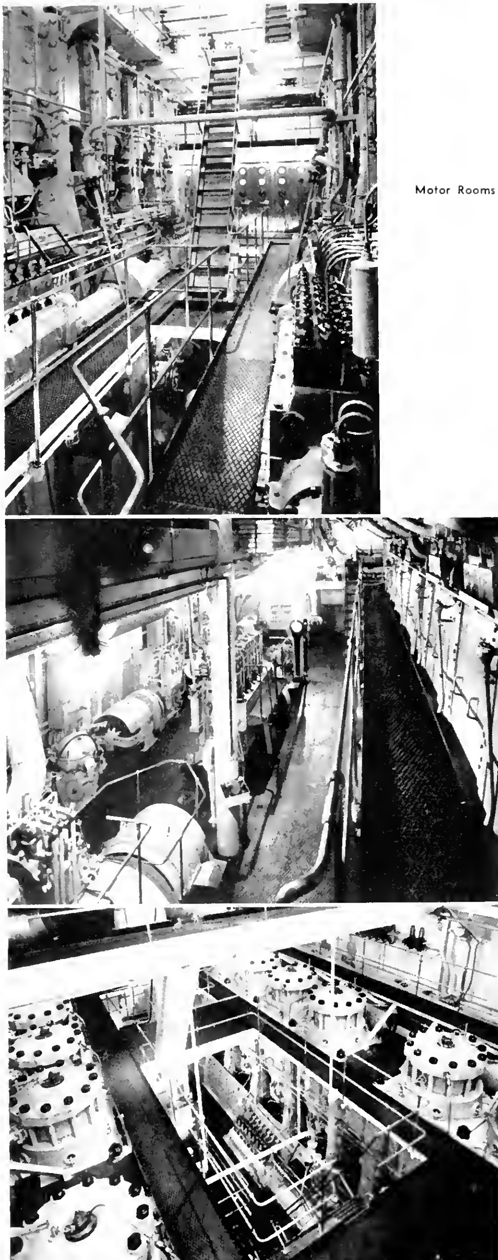
Promenade and Boat Deck Plants of the Seattle



PROMENADE DECK



BOAT DECK



Motor Rooms on the Seattle.

followed by two more sisterships during 1948, while the remaining two of the series will be delivered as soon as the capacity of the shipyard permits.

The new ships have a contracted speed of $19\frac{1}{2}$ knots, fully loaded. They will thus be the fastest cargo carriers in the services between America and Europe. Indeed, at the time when the *Seattle* was delivered, no faster cargo ships were known to be in commission anywhere on the high seas.

A number of new constructional features have been incorporated in these ships in order to gain the greatest possible advantage of their high speed. The holds and cargo handling gear have been specially designed with a view to quick loading and discharging, thereby shortening the time spent in port—a feature that may prove to be of as great importance as the high speed.

One such innovation is the substitution of specially designed electric deck cranes for the customary winches and derricks, each ship carrying 14 such cranes. Moreover, the number of hatches has been increased to enable a larger number of gangs to work simultaneously, and the efficiency in working the ship is further improved through the arrangement of the deck fittings and rigging. In order to afford the cranes more unobstructed space the usual after mast is eliminated, while the foremast has no other function than to support the lantern, aerial, Tyfon siren, etc.

There are six refrigerated holds with a total volume of about 95,000 cu. ft. One third of this space may be refrigerated for carrying deepfrozen products (— 20 Centigrades which is — 4F.).

The hull is all-welded, signifying inter alia that the frames are welded to the plating, as well as all beams to the deck. The double bottom is also welded all around and is provided with extra docking keels, which enable the ship to be docked with a couple of thousand tons of cargo on board. Reinforcement for running in ice stretches as far aft as to the forward engine room bulkhead. The definitive shaping of the hull was preceded by exhaustive model trials in order to produce the most suitable design. The propellers were also tested in models, and were only selected after a number of different types had been tried out in combination with the hull models.

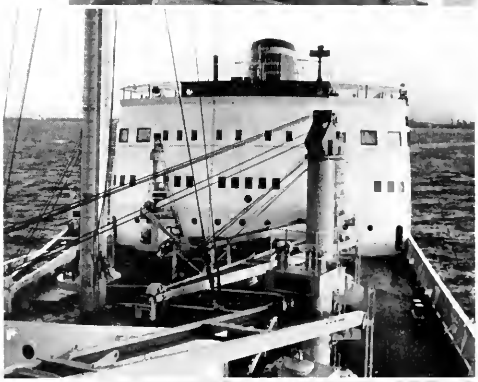
The ventilation of the holds is effected by motor-driven fans in deckhouses on the fore and after decks. Only a small number of fixed ventilators of the ordinary type are installed. All holds are provided with devices for extinguishing fire in the cargo. The ships are equipped with all modern aids to navigation, including radar and autopilot.

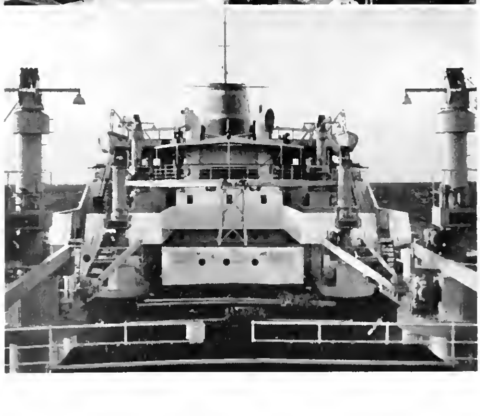
Stainless steel has been largely used in galleys, pantries, refrigerated provision rooms, stores and washrooms. Like most Johnson Liners these new ships are

equipped with comfortable accommodation for a limited number of passengers.

Owing to these novel arrangements the *Seattle* type differs in appearance quite considerably from other modern ships, the large number of cranes, the single mast,

Top to bottom: One of the 14 electrical hoist cranes on the Seattle. Looking aft from the bow of the ship. Looking forward from a point near the stern of the ship.





and the streamlined hull and superstructure giving it a very special silhouette.

The *Seattle* series has been planned by the technical department of the Johnson Line and is built by the Swedish shipbuilders *Kockums Mekaniska Verkstad.*

The Johnson Line has been operating services to the North Pacific for over 30 years. Regular sailings were started in 1914—the same year as the Panama Canal was opened, whereas the first voyage on this line was made round the Horn before the canal was completed.

In 1912, the same year as that in which the first Diesel-driven sea-going vessel in the world was completed, the Johnson Line took delivery—the second shipping company in the world to do so—of a Diesel-engined cargo liner. In 1922 the Company was the first to possess a fleet consisting entirely of Diesel ships, and at the end of 1947 the Johnson Line had 32 motor vessels aggregating 250,000 tons in traffic, while 8 or 48.000 tons were on order.

The ships are propelled by two Kockum-M.A.N. Diesel engines of double-acting type: cylinder diameter 720 mm and stroke 1,200 mm. Together the two engines develop 14,000 shaft HP at 110 rev. per min., giving the vessels a contracted speed of $19\frac{1}{2}$ knots.

In the *Seattle* class of ships the ordinary winches and derricks are replaced by no less than 14 electric cranes of a new design. The arrangement of the cranes, moreover, gives them an exceptional reach—41 feet—making it possible to handle goods from and to the ship even on the second railway track from the pierside. The lifting capacity of the cranes varies from 2 to 5 tons, and up to 10 tons in some hatches by operating two cranes in pairs. Two of them can be used for lifting engine parts directly out of the engineroom through the skylight, and by means of special devices they can also handle the lifeboats.

The operating controls of the cranes are extremely simple and are provided with effective safety devices to prevent casualties from faulty manipulation.

While ships of this class and size usually have only five hatches, the *Seattle* has seven. This enables more gangs to be at work simultaneously, and, moreover, affords greater possibilities for stowing the cargo in such a way as to make it easily accessible for discharging. The elimination to the greatest possible extent of stanchions further contributes to rapid loading and unloading. The interior trimmings of the holds are largely vertical, and all holds, including the refrigerated chambers, are lighted

Axel Axson Johnson
president and owner of the Johnson Line.

The Seattle—view of the promenade deck vestibule.

by permanent fixtures, thereby avoiding the trouble of rigging up portable lighting.

All the shifting beams for the ordinary holds move on roller bearings in the same plane as the hatch, enabling the cargo to be got at without lifting any beams.

The Seattle—view of crew's quarters.

Fred Doelker
West Coast manager of the Johnson Line.

Tanker Transportation

By M. G. GAMBLE, Manager Marine Department
Standard Oil Company (New Jersey)

One of the foremost questions within the industry today on the subject of tankers is: "Are there enough tankers?" If there are, "why are we experiencing such a transportation shortage?" The correct answer to the first question, I believe, is that there are ample tankers in the world today. As of October 1, 1947 there were 96 U. S. government-owned T-2 type vessels in tie-up, over and above nearly 200 in operation. In regard to the second question, the prolonged shipyard strike kept a substantial number of tankers out of service from July to November. Several months have been required in most cases to process the purchase by private industry of T-2's from the U. S. Maritime Commission. Also, both military and commercial requirements have proved to be far in excess of previously estimated needs. All these factors, I think, explain why, in spite of there being enough tankers over the longer term, we are at present handicapped by an artificial shortage of water transportation.


M. G. Gamble

Progress is now being made in returning all modern tankers formerly in tie-up to active operation, and steps are being taken to sell all Maritime Commission tankers promptly to private interests. However, it is difficult to foresee when all of these steps will be effective in remedying the situation, because of the extent of the accumulated shortage. As vessels taken out of tie-up for sale or operation require repairs, the shipyard situation will largely govern the speed with which the shortage can be alleviated and finally overcome.

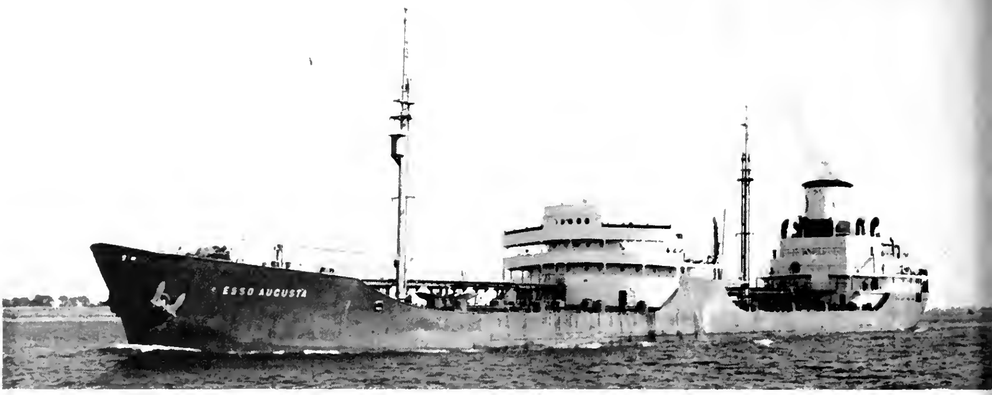
From a long-range standpoint, it is felt that building in Europe—which apparently is being greatly retarded by material and labor shortages—will not, in itself, provide all tonnage needed to keep pace with world requirements, and construction in U. S. yards will, therefore, be necessary.

For national-defense purposes tankers should be fast, modern, and efficient in order to minimize the risk from enemy action and to insure prompt delivery of cargo. No less is this true for economical commercial operation. It is fortunate, therefore, that the government has promoted sales to legitimate buyers for foreign registry, as this will provide an opportunity in the future for modernization of the U. S.-flag tanker fleet.

War Construction

The war resulted in the loss of about 40 per cent of the prewar worldwide tanker fleet. However, it also had the effect of hastening the general utilization of larger and faster ships. For example, the average prewar American-flag tanker had a deadweight tonnage of about 11,500 tons and a speed of about 10 knots, whereas today the average American tanker has a deadweight of about 15,000 tons and a speed of 14 knots. In general, we might safely say that the size and speed of a tanker, within certain limits, are all-important in reducing operating costs. This is particularly true with today's high and rising costs.

Our government constructed during the war about 9,000,000 tons of T-2 type tankers. These vessels have a deadweight of about 16,600 tons, a speed of 15 knots, and a capacity of 138,000 bbl. of gasoline. In most trades oil can be transported in them about 25 per cent cheaper than in a prewar 13,000-ton 12-knot tanker, and for about 30 to 40 per cent less than on the old 11,000-ton vessels. Looking at this question in another



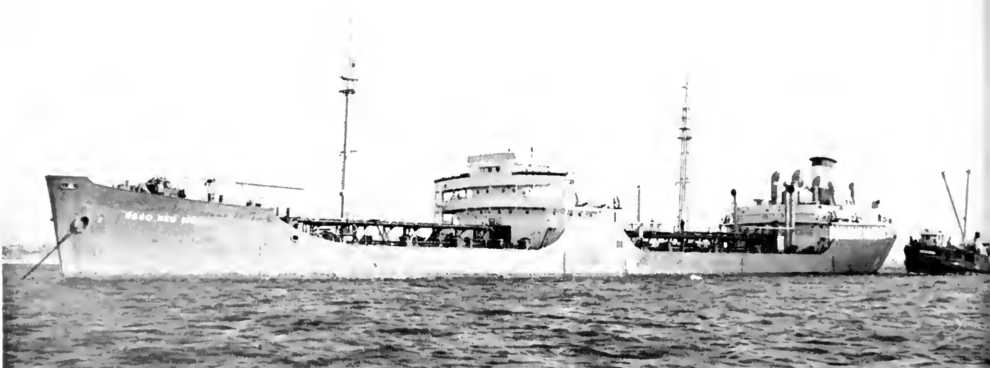
Esso Augusta. 17,950 dwt. Diesel Drive; 547 ft. 2¾ inches overall length; 153,704 bbls. cargo capacity; built by Sun in 1940; Sun-Doxford Diesel.

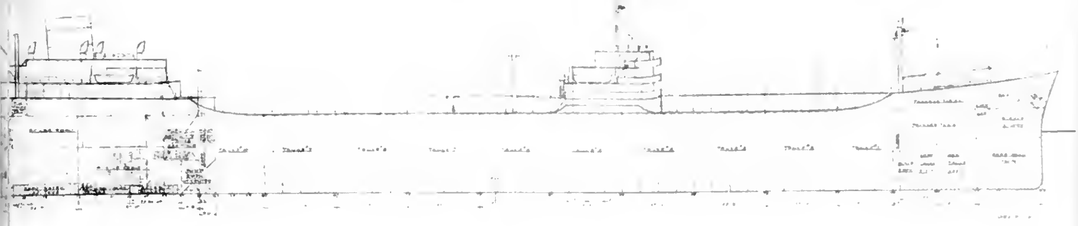
way, it is estimated that out-of-pocket operating costs have about doubled since 1939. However, the increased size and speed of the modern fleet, with consequent increased haulage capacity, has fortunately reduced the cost per ton-mile, so that the effective rise on that basis has only been about 65 per cent.

New Tanker Types

Inasmuch as it is obvious from the foregoing that large, fast tankers are an answer to the high cost which owners—and, I might say, particularly American owners—are experiencing today, the question naturally arises as to how far one should go in this matter of size and speed. Since difficulties have been experienced in accommodating T-2 tankers in many ports, some may question the advisability of going to still larger ships. However, various waterway improvement projects already carried out or in progress by the U. S. Army Engineers, coupled with terminal improvements by private companies, have greatly improved this situation. Recent studies made on this subject by our technical staff have led to the design of a 26,000-ton 16-knot vessel with a length of 628 ft. and a draft on summer freeboard of 31½ ft. This is felt to be the most practical answer to the foregoing question. The draft, which is only slightly more than a foot above that of a T-2, will permit this large vessel to enter the majority of ports which can accommodate T-2's with

Esso New Haven. 16,608 dwt. Turbo electric; 523 ft. 6 inches; 135,335 bbls. cargo capacity; built by Sun in 1944.





THIS IS THE NEW GIANT TANKER referred to in Mr. Gamble's article. It will approximate 27,000 deadweight tons, carry some 228,000 barrels, and save about 20% in transportation costs over the T-2. Sun Shipbuilding and Drydock Co. and Newport News already have contracts for this type from Standard of New Jersey, Socony, and Gulf Oil.

full cargo. The cargo tank capacity, after making the usual allowance for expansion, is about 228,000 bbl. It is estimated that transportation costs on such a vessel would be about 20 per cent less than on a T-2. Naturally, the use of this size of tanker will involve some sacrifice in flexibility, both as regards the grades that may be carried and the terminals at which they can be accommodated. In the early stages, these vessels would probably be used principally with fuel oil and crude oil; but, with the present upward trends in the volume of petroleum products consumed, it is a safe assumption that, as time goes on, they will be used to an increasing extent for the transportation of products. Also, as vessels of this size increase in use, they will be taken into account in the design of future terminal facilities, and in the improvements in existing ones both here and abroad.

Operating Costs

Just as high operating costs highlight the need for large fast tankers, so do these high costs (many of which go on in port the same as at sea) accentuate the need for quick turnaround. The average cost of a T-2 at the dock is about $1,800 per day, which gives some idea of the importance of keeping port time to a minimum. Given the proper shore facilities, a modern tanker is capable of loading or discharging at a rate of at least 10,000 bbl. per hour. It is in the common interest of all concerned, therefore, including suppliers and consignees, to provide loading and discharging facilities with the maximum capacity justified by the volume handled. In normal times, when rates follow closely the market situation, the charterer with a reputation for quick turnarounds will be favored over others. Another factor which may react to the charterers' benefit is the covering of their requirements well in advance and for as long a period as practicable. Over the long run, rates reflect the owner's costs; and it is, therefore, in the interest of all concerned to keep these costs to a minimum.

Beginnings of Inland-Waterway Transport

Let us now turn from the subject of ocean tankers and discuss briefly inland-water operations in the United States. Here there are more than 26,000 miles of navigable waters. Of this total, 9,200 miles, or about 35 per cent, have a depth of 9 ft. or more; and 14,300 miles, or about 54 per cent, are 6 ft. or more in depth. The remainder have depths less than 6 ft.

Inland-waterway transportation began at the time oil was discovered in Pennsylvania in 1859. Oil was then moved on rafts, which were steered by poles and floated with the current from the upper reaches of the Allegheny River to the Pittsburgh area. Since this early beginning, transportation has evolved until in recent years large single barges, or groups of them in flotilla are towed or pushed in our inland rivers. On other waterways, where deeper drafts are possible and other considerations favorable, small self-propelled tank vessels are used. However, by far the greater volume is still transported in non-propelled equipment.

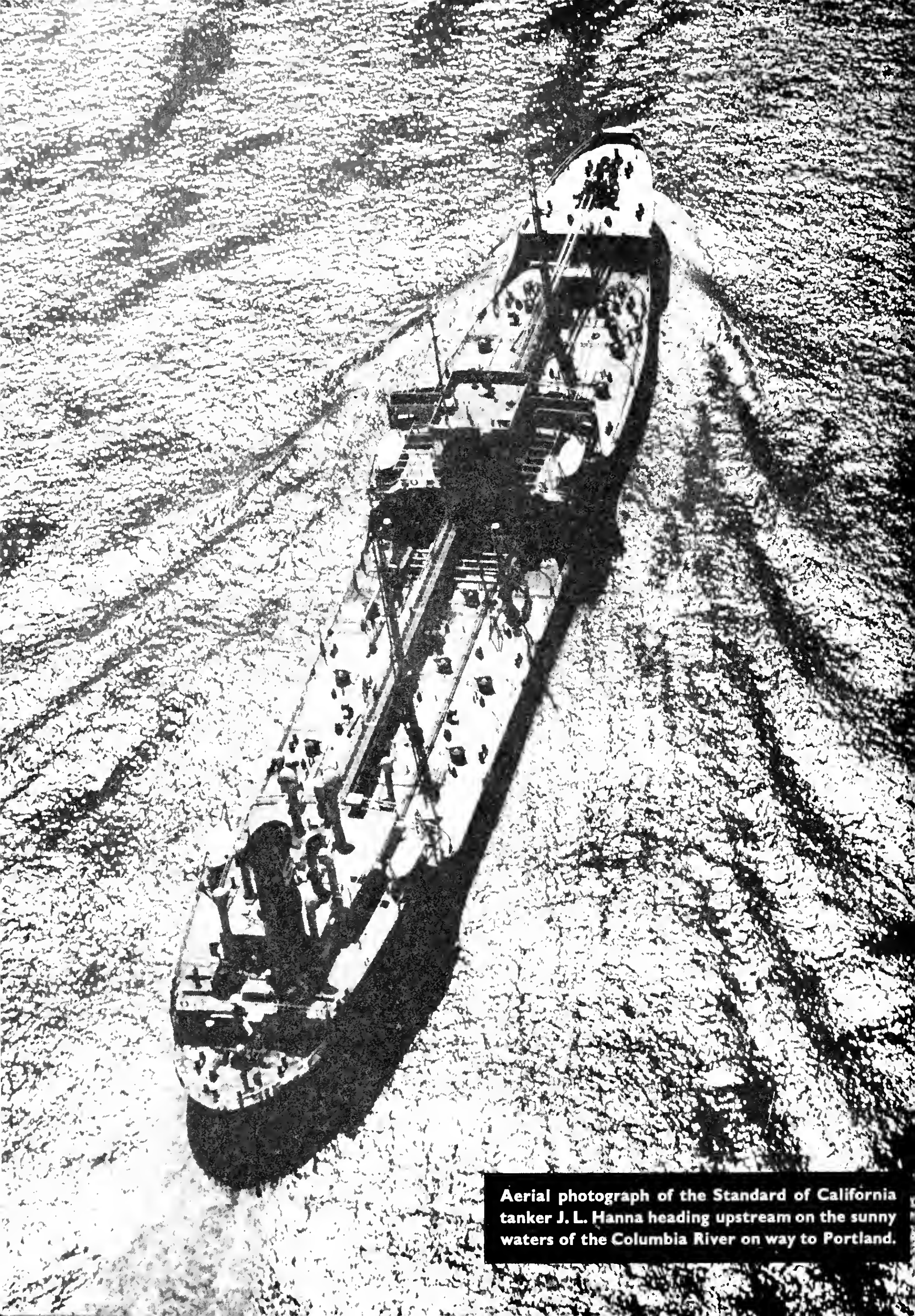
Non-propelled Equipment

One might ask why greater utilization is not made of self-propelled equipment. The answer, as far as our own operations are concerned, is that, in the majority of river operations, the greatest economy lies in the use of non-propelled equipment handled by powerful pusher-type towboats, and in certain other operations barges towed by conventional tugboats give better results. The latest type of river towboats has a horsepower of 2,000, and pushes twelve 9,000-bbl. barges, making a total capacity for one tow of 108,000 bbl.

With a tow of this kind, one or more barges are released as terminals are reached on the route, and the towboat with the remaining barges continues on the voyage, thereby avoiding the laying up of the power plant while barges are being discharged, as would be the case with a self-propelled barge. When a sharp bend, coupled with a narrow channel and perhaps a swift current, makes the going hazardous, the majority of the barges may be moored while the towboat takes one at a time over the difficult crossing. Also, additional barges of suitable type and draft may be rented for use with the tow as occasion requires. In our western-rivers operations, the usual permissible draft is in the neighborhood of 9 ft. to 10 ft., which, coupled with other local conditions, is not satisfactory for economical self-propelled barge operations.

On the Gulf Intracoastal Canal and, to some extent, along the inland waterways of the Atlantic seaboard, barges towed by small tugboats of the type seen around New York Harbor are commonly used. Tugs and barges have, in the majority of cases, also been found to be the most economical units for bunkering large vessels. This is because of the length of time consumed alongside the ship being bunkered and the consequent saving of the power plant's time. This saving is especially important today with the prevailing high wages.

Again referring to our own company's operations, in the Chesapeake Bay, the Erie Canal, the New York State Barge Canal, and the Great Lakes, as well as for short



Aerial photograph of the Standard of California tanker J. L. Hanna heading upstream on the sunny waters of the Columbia River on way to Portland.

coastwise trips on the north Atlantic seaboard, conditions are favorable for the use of self-propelled equipment. Such of our equipment now in use consists of 6 self-propelled diesel barges ranging in capacity from about 600 bbl. to 13,700 bbl. Our people are now taking steps to acquire larger units with capacities of more than 18,000 bbl. for use in the New York State Barge Canal and on the Great Lakes.

Barge transportation costs vary with the volume involved in each shipment, the distance covered, the efficiency of the unit used, and the extent of delays at terminals and in transit. Where conditions are favorable for the use of self-propelled equipment, the larger and faster the vessel up to limits governed by local conditions, the lower will be the transportation costs.

In any new inland-waterway operation where a choice must be made as to the type of equipment to be used, the right decision can only be reached after a careful study of all the factors involved. Among these are:

1. The physical characteristics of the waterway, i.e., whether open but "easy" water, open with strong current, locks present; or whether there are shallow crossings with swift currents, sharp bends, etc.
2. Kind of terminal facilities available at loading and discharging ports.
3. Volumes to be handled annually.
4. Size of deliveries.
5. Generally accepted local competitive transportation practices.
6. Labor and other costs.
7. Special regulations governing the use of waterways.

Taking all of these factors into account, an economic study is made to determine the most advantageous and economical type and size of equipment for the intended service.

Among the advances made in recent years in barging equipment are the following

1. Improvement in the lines of non-propelled barges. For many years short stubby rakes at the bow and stern were used. The latest design in these barges employs the so-called "Dravo hull," which has been developed after exhaustive model basin tests. With this design, the rakes at both ends are longer, but the stern is designed in such a way as to facilitate the clearance of water and the elimination of drag.
2. The stern-wheel towboat, so long in use on the Mississippi River and tributaries, and very aptly described in a recent issue of *The Lamp* under the title "Big Mama," is being replaced gradually by a more powerful pusher-type towboat with finer lines and conventional twin screws. Two of the new type are now being built for our company.
3. As time goes on, no doubt there will be a more extensive use of twin-screw self-propelled barges of from 15,000-bbl. to 20,000-bbl. capacity, with speeds up to 12 knots and drafts of more than 12 ft.

Water-Transport Advantages

In conclusion, I should like to stress the advantage of water transportation from the standpoint of flexibility wherever conditions are favorable to its use. Both ocean tankers and inland-waterway equipment can be readily moved from one area of operation to another to suit changed conditions. As petroleum becomes more extensively used throughout the world, the need for its transportation by water gains increasing importance, and today the best estimates of normal postwar shipping show tankers comprising almost half of the total U. S. merchant fleet.

DEVELOPMENT OF SHIP FORMS

By WILLIAM A. BAKER, Assistant to Naval Architect

Bethlehem Steel Company's San Francisco Yard

Part III

Modern Practice

Russell and Rankine with their respective theories on the resistance of ships directed the attention of naval architects to the importance of wave-making and frictional resistance; it fell to William Froude and his son to combine the two in their proper relation. It is beyond the scope of this paper to give detailed accounts of the multitude of experimenters who followed. There have been additional frictional experiments, series tests to determine the effect of methodical changes of form, tests of ships in waves as well as those for wave-making, etc. For the average ship designer the works of David W. Taylor of this country and G. S. Baker of England are the most useful; for some forms those of McEntee, Semple, Robertson and Ackerson may also be consulted.

At the present time there are three general methods for determining the power required to propel a new ship at the desired speed: By the old Admiralty coefficient, by independent estimate or by model tank test. In practice the Admiralty coefficient is normally used for rough estimates in the preliminary stages of a design, while, unless the ship is to be of unusual form for which no data exists, the model test is used as a check on some

form of independent estimate. The independent estimate can be calculated from model results of similar ships, by Taylor's "Standard Series", from Ayre's curves or from C curves published by Baker and others.

The methodical series tests performed by D. W. Taylor form the basis of the well-known "Standard Series" which are presented as contours of residuary resistance per ton for constant values of $V/\sqrt{L}$ plotted on grids of $\text{DISPL.}\Big/\left(\frac{L}{100}\right)^3$ and prismatic coefficient. There are two sets of charts showing the contours for beam-draft ratios of 3.75 and 2.25 respectively; values for ship between these ratios are interpolated.

The following describes the basic model:—"In 1902 a model numbered 164, constructed to the lines of the British armored cruiser *Leviathan* of the *Drake* class (1900), was tested in the U. S. Experimental Model Basin at Washington. The design embodied a bulbous ram bow with a twin-screw cruiser stern, on a ship of the following characteristics:—

Length on load waterline...	521′0″
Length between perpendiculars .	500′0″
Beam	71′1″
Draft, zero trim ...	26′0″
Displacement, Salt water ...	14100 tons
Block coef. .	0.513
Midsection coef. ..	0.923
Prismatic coef. ..	0.555
Waterplane coef. .	0.660

"For years later at Washington the sectional area curve, waterline plane, and bow and stern profiles of this model, together with a mathematically derived body plan, were chosen for Model 632. This model was used as the parent form to develop thirty-eight (38) models, designated Series 18, for an investigation of the effect of changes in longitudinal coefficient or resistance . . ."

One point which some fail to note in estimating the

Salient features known to be necessary to ensure good performance for various types of ships:

Type of ship	*Slow speed cargo ships*	*Medium speed ships*	*Cargo liners*	*Intermediate liners*	*High speed liners and fast coastal passenger vessels*
Pris. Coef.	0.82-0.78	0.78-0.75	0.75-0.70	0.70-0.65	below 0.65 and
(P)	0.4-0.6	0.5-0.60	0.55-0.65	0.60-0.80	0.70-0.90
Length of parallel body	34%	up to 25% depending on beam	up to 25% up to 20%	10% 0% with hollow L.W.L. fwd. 0% with straight L.W.L.	None
Entrance/run	0.6-0.8	0.8 to 0.9 1.00	1.0 L_E must be long enough to avoid $V=1.09\sqrt{L_E}$ hump	1.0	1.1
L.C.B. as % L from amidships. Single screw ships.	2%—1.0% fwd. fwd.	2%—1.0% fwd. fwd.	1½% to ½% fwd.	1.0% fwd. to 1.0% aft.	⅓% aft to 1% aft.
Shape of area curve	straight ends	straight ends—medium hollow fwd.	straight ends—hollow curve fwd.	fine entrance essential	fine ended curve of areas. Bulbous bow useful above (P)=0.75
Shape of L.W.L.	Bow—slightly convex throughout—fairly straight slope >20°C	Bow convex—Bow convex to straight	Bow lines either straight and long entrance or hollow and short entrance	Bow lines hollow—bow lines straight	Fine L.W.L. fwd. hollow
½ Ent. Angle on L.W.L.	35° 32°	30° 27°	24° 16° straight or 12° hollow	18° 12° hollow or up 16° straight	Down to 6° with hollow
Midship sec. coef.	0.98-0.99	0.98	0.98	0.98	0.95

Cruiser stern: Reduces resistance up to 6% for slow speed cargo ships.
From "The Fundamentals of Ship Form" F. H. Todd.

(Please turn to page 90)

The Good Neighbor Fleet Sails Again

Albert V. Moore, President, Moore-McCormack Lines, Inc.

Following up the lengthy technical article on Moore-McCormack's "Good Neighbor Fleet" in the June 1947 Pacific Marine Review, the story of the completion and sailing of the *Argentina* on January 15 heralds the resumption of service on the route which she left a few days after Pearl Harbor when she was drafted by the Army and started on the career of a troop carrier. Serving in this capacity until August 31, 1946, she steamed 335,906 miles and carried approximately 200,000 passengers.

Today, fully reconverted and overhauled at the Brooklyn 56th Street yard of Bethlehem Steel Company she is in every respect better than her former self. A number of improvements have been added to satisfy the latest demands for safety and to insure every convenience and comfort according to present standards of travel.

The *Argentina* is the second largest liner in the American merchant marine to resume postwar service. She is one of three sister ships owned by the U. S. Maritime Commission and operated by Moore-McCormack, the other two being the *Brazil* and the *Uruguay*. Although she was the last of the trio to be laid up for reconversion, she is the first to be completed. She entered the Brooklyn 56th Street Yard in November 1946 and work was started shortly after her arrival. However, due to the strike of the shipyard workers during the summer and early fall of last year work was suspended for about five months, making the actual working time about eight months. This is the largest peacetime reconversion job ever handled in New York harbor.

The contract for the conversion in general called for restoring the vessel to its prewar condition. This included removal of standee berths, messing facilities, and all defense features—gun foundations, armor, magazines, degaussing equipment, and many others added to the vessel by the Army. All public spaces were completely stripped and modern furniture and furnishings, murals and other decorations installed. The staterooms as well as officers' and crew's accommodations were likewise redecorated and equipped with new furnishings.

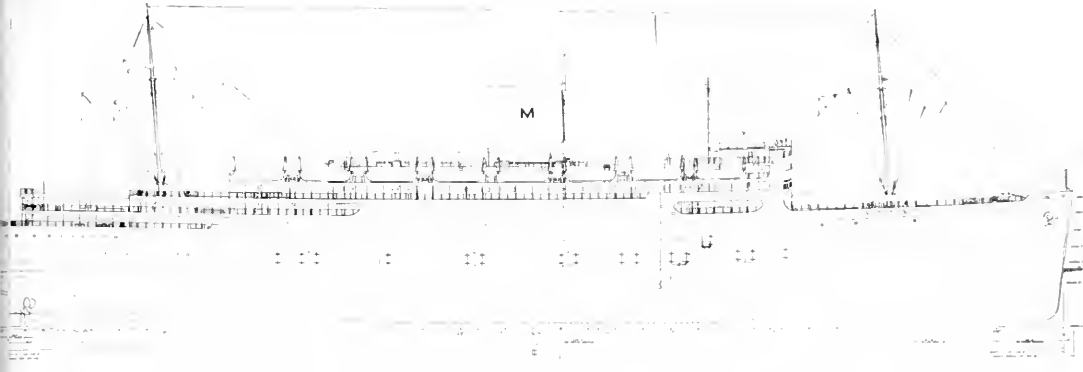
In addition the vessel was fire-proofed in accordance with the U. S. Coast Guard requirements, a procedure which meant the installation of incombustible ceilings, linings, fire screen bulkheads, new steel stairways, adequate escapes, an extensive sprinkler system, and many other features.

The *Argentina* is a twin-screw vessel with turbo-electric drive of 18,000 horsepower, 613 ft. long with 80 ft. beam and a loaded draft of 34 ft. Her prewar speed was rated at 18½ knots although she actually exceeded that figure. The registered gross tonnage is 20,500, the displacement 33,000 tons. General cargo space is 450,000 cu. ft. bale capacity, in 6 holds, with additional 95,000 cu. ft. refrigerated space in 3 holds. After her conversion she

Emmet J. McCormack, vice president Moore-McCormack Lines, Inc.

THE ARGENTINA - - - - She's Off!

She was formerly well known on the Pacific Coast as the Pennsylvania



Outboard profile. For inboard profile, see folded insert.

now accommodates 359 passengers in First Class and 160 in Tourist, with a crew of 380 officers and men.

Soon after her arrival in the yard the *Argentina* was placed in drydock for survey. The underwater bottom was sand-blasted in four days, an exceptionally fast performance on a vessel of this size. Due to the extensive bottom work that turned up, she remained in drydock until January 20. A number of bottom plates were renewed, and several thousand rivets were renewed and/or welded as required.

The boilers and propulsion machinery and all pumps and auxiliaries were opened, inspected, and the necessary repairs performed. All cargo and service refrigeration spaces were completely gutted and renewed, using mineral wool insulation. Thousands of feet of electric wire and cable were torn out and the lighting system renewed in its entirety, modern indirect lighting being used wherever suitable. All interior communication systems were removed and renewed, and all electric motors on the ship were completely overhauled, cleaned and tested. The existing radio and radar were completely overhauled also.

After a hydrostatic test, it was found necessary to replace the hot and cold salt-water system throughout the vessel. Existing lead soil lines were also removed and new welded steel soil lines installed. Sanitary fixtures, such as tubs, wash basins, and water closets were taken out and replaced with modern fixtures.

A new steel deck was installed in way of the galley on the C deck, and the ship's service refrigeration boxes on the D deck, as it was found, upon removing the covering in these areas, that the original steel decking was almost completely wasted. About 1,000 additional tons of block ballast was placed in No. 3 hold.

Included in the inspection of the vessel was the drilling of all steel decks, bulkheads and shell plating, to gauge their thickness. Another large item was the survey of the wood decking throughout the ship, a large part of which it was found necessary to replace. Oregon pine, 3x4 in., with edge grain on the exposed surface, was used, and all decking was repayed and caulked preparatory to sanding to a smooth finish. Deck covering was also removed in all foyers and in many of the public spaces and replaced with magnesite terrazo.

All drinking-water tanks were cleaned, scraped to bare metal and recoated. Doors of every description—weather doors, screen doors, and joiner doors were reconditioned or renewed, as found necessary. All windows were replaced with new modern types and existing airports reconditioned and equipped with scoops and insect screens throughout. Cargo-port doors and other openings sealed off by the Army to meet blackout requirements were restored to their original condition.

In the redecoration and refurnishing of the ship, major emphasis has been placed on simplicity in all decorative treatment. Pleasing and attractive effects have been attained by various color combinations and by suitable design and placement of furniture, plants and flowers. Murals and sculpture play a secondary part and do not dominate the scenes. Donald Deskey Associates, of New York, designed and selected the interior decorations.

Several features of the *Argentina* will attract the attention of the traveling public. The main lounge, on the promenade deck, is large and formal. It has been named the Tango Room, as a tribute to the dance which all the world associates with Argentina. A multi-purpose room, the lounge lends itself flexibly to a number of uses, from comfortable lounging to dancing and other types of entertainment. A stage has been erected at one end. Behind the stage is a movie projection booth and film storage. Facing the stage is a large mural, a seascape by Loren MacIver entitled "Voyage." Large French windows open into the promenade deck on both sides. The old wood flooring has been removed and replaced with magnesite underlayment for a carpet, except at the center where a vinyl tile dance floor has been laid over the underlayment and where the carpet can be removed during dancing. White, warm grey, bluish grey and brown are the predominating colors in walls, rugs, furniture, and hangings.

Continuous ribs run across the ceiling athwartship, recalling the character of the ship's framing. In the center of the ceiling a transverse frame with longitudinal baffles forms an egg-crate effect below the skylight. Through this device natural daylight enters, while at night artificial light is admitted, to give a diffused, glare-free, highly pleasing effect.

The lounge and all other public spaces are equipped with an entertainment sound system for broadcasting radio programs and recorded music.

Immediately forward of the lounge is the library, named for a former chief officer of the *Argentina,* Captain Henry Olin Billings, who died a hero's death when his ship was sunk off the coast of Africa in 1942. A bronze plaque has been placed in this room to indicate that Captain Billings has been chosen as a repre-

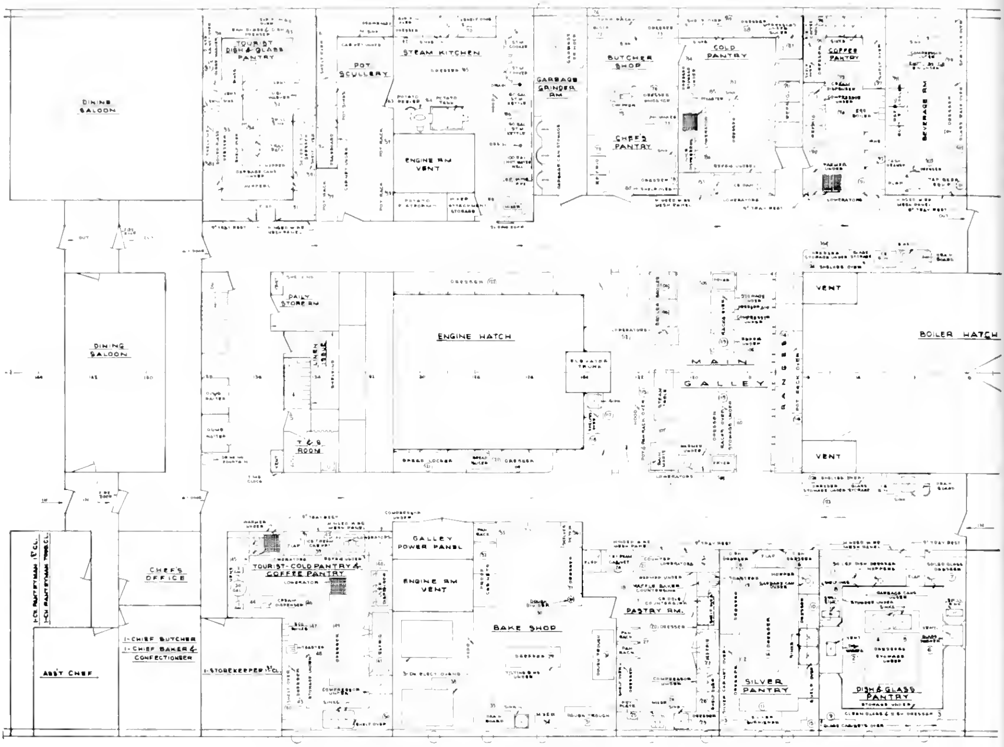


Diagram showing arrangement of main galley, as well as various bakeshops and pantries.

sentative of the many young Americans carried by this vessel who never returned from the war. The plaque has the following inscription:

"To the men and women of the Armed Forces of the United States who went in this ship to meet the enemy in World War II and gave their lives that the ideals of their country might survive, this library is reverently dedicated."

The library offers a quiet, secluded atmosphere, with the main decorative motifs in grey, brown, and natural oak.

The smoking room with adjoining writing room, aft of the lounge, is an H-shaped room, with a centrally located bar. Pole trellises with growing plants are placed on each side of the banquette seats and tables facing the bar, to supplement the intimate quality of the room with one of freshness. A mural of Eric Mose on the wall above the seats and extending into the dome depicts the economic pattern of South America.

Light grey terrazzo is used for deck coverings, with the predominating color in walls and furnishings a warm grey and natural oak.

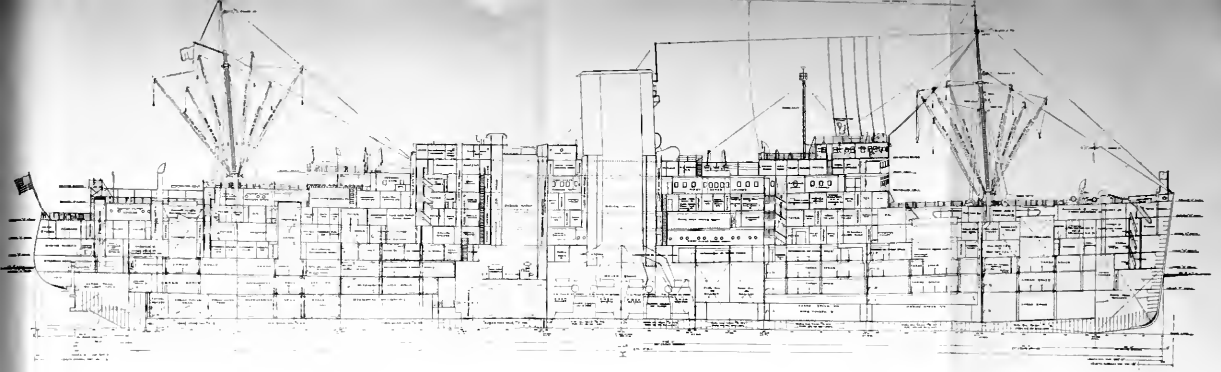
Located aft on the promenade deck is the veranda cafe, known as the Mar Del Plata Club, and named for the famous watering resort near Buenos Aires, one of the most beautiful places of its kind in South America. French windows face the promenade on both sides, while large glass doors open onto the swimming pool. Banquette seats and tables are arranged along the port and starboard walls, and small tables and comfortable chairs elsewhere around the room. A large mirror behind the bar reflects the deck activities and augments the apparent size of this relatively small, but highly attractive cafe. Gay colors are used throughout, creating an atmosphere of light cheerfulness. Trellis screens with climbing plants add much to the charm of the room.

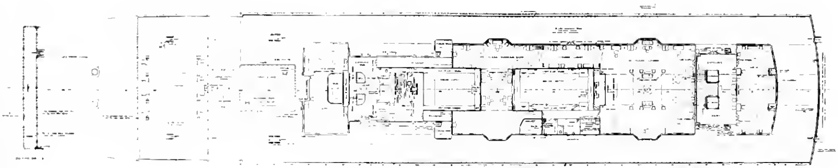
The large outdoor swimming pool, immediately aft of the veranda cafe, has been completely refinished with an attractive lining of blue tile and with underwater lighting and overhead flood lights for night swimming.

Both the First Class and the Tourist dining rooms are on the C deck, separated by galley and pantries and by a large, roomy emergency escape within easy access of the entire area, providing an escape up to the promenade deck.

The two dining rooms extend the full width of the ship, and both have a central dome with special lighting arrangement. In First Class this is an egg-crate construction similar to that in the main lounge, in Tourist Class an indirect lighting effect. Flush-mounted ceiling lights are used on the outboard sides. Oak tables on metal pedestals are used in both dining rooms, and are arranged for from two to fourteen persons in First Class, and from two to eight in Tourist. The two dining rooms will seat 300 and 166 persons, respectively.

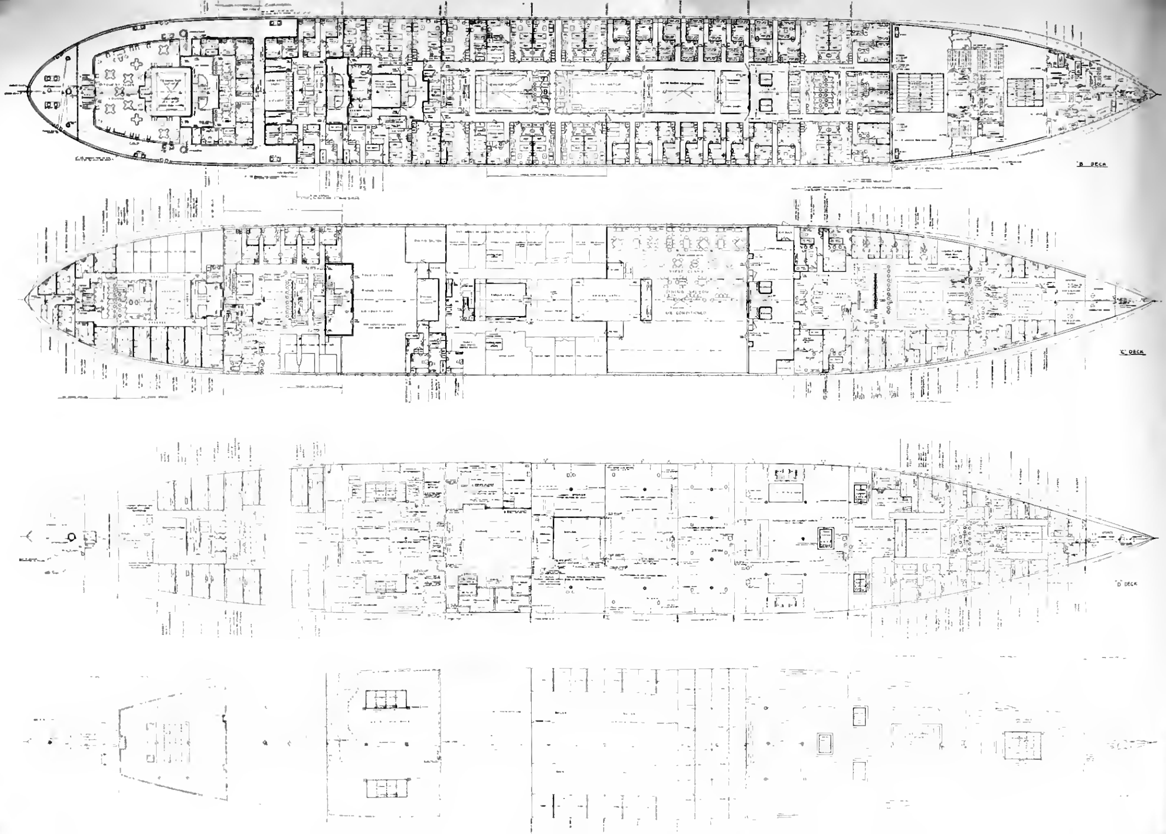
Both dining rooms are air-conditioned, and, like all





PROMENADE DECK

A DECK



"B" DECK
"C" DECK
"D" DECK

other public spaces on the ship, they have been fitted with sound-proof ceilings.

Decorations in the First Class dining room include a stainless steel statue, "En Route," by Jose de Riviera. Attractive flower boxes under the windows add a cheerful note.

Practically all of the equipment in galley and pantries is new—electric ranges and ovens, steam tables, coffee urns, refrigerators and all-metal dressers and sinks with stainless steel tops. New non-skid tile decking has been laid throughout the entire area. Individual dining rooms for officers and concessionaires are also located in this space.

Mess rooms and galley for the crew are forward on the B deck. Special service pantries are provided on all decks where public spaces are located.

The Tourist lounge and smoking room are aft on B deck. Decorations in the smoking room include a painting "Sea Image", by Theodose Stanos. A swimming pool for this class is arranged in upper section of No. 6 hatch way.

First Class staterooms are on the A and B deck and are arranged for occupancy by two, three, or four persons per room. Except in a few cases where two adjoining rooms share bathroom and toilet facilities all have private bath, shower or tub, the latter predominating. All staterooms in both classes, and also those of the crew, are outside rooms, and each room is equipped with an oscillating wall fan. The rooms are designed to provide maximum comfort and convenience. Spaciousness is attained by the use of low beds, widely separated to effect as little interference as possible where strangers share rooms. All beds have inner-spring mattresses. In a number of rooms an extra bed of the Pullman type has been added. The type of furniture used, and its arrangement, are aimed at creating a sitting room lounge effect. Color schemes have been selected that suggest coolness and comfort in the tropical atmosphere of the Southern runs.

Two de luxe suites are arranged on the A deck. These consist of bedroom, bath, a sitting room opening upon the main lobby, and an outside veranda. In addition to these suites, a few of the regular staterooms may be combined into bedrooom-living room suites if desired.

The tourist staterooms, all on the C deck, are arranged for occupancy by two to four passengers. They have beds of the built-in type, equipped with innerspring mattresses. Some of these rooms also have an extra Pullman bed.

No staterooms in this class have private bath, but all have running hot and cold water. Bath and toilet facilities are conveniently spaced throughout the area.

The officers' quarters are on the boat deck, the crew's accommodations on B, C, and D decks, some fore and some aft. Three recreation rooms and lounges and four mess rooms have been provided for the crew. All officers' quarters were completely refinished, and some of the furniture was renewed.

From one to six men are berthed in each room in the crew's quarters, in two high standee berths with innerspring mattresses. These quarters were also completely renovated and equipped with new furniture.

Many changes were also made in the ship's hospital, on C deck. This area has a male ward with eight beds, a female ward with five beds and an isolation ward with one bed, in addition to a medical office, dispensary, pharmacy, diet kitchen, bathroom and toilet facilities.

A gift shop is located on the A deck, a beauty parlor on B deck, and barber shops on B and C decks.

All of the ship's rooms and the running and standing rigging were renewed, all blocks tested and reconditioned or renewed.

A large area on the boat deck is set aside for deck games. This space also has a gymnasium and a large children's playroom.

The ship's 15 existing lifeboats, including one motor driven with radio receiver and transmitter, were all reconditioned, and three new lifeboats with davits and winches were installed. One existing motor driven lifeboat was discarded. These boats accommodate approximately 950 persons. They are all handled by mechanical davits and are raised by electric motor-driven winches.

A 14 hr. sea trial was carried out on Dec. 30, over a course between Ambrose Lightship and Barnegat Bay. After testing the compasses and the radio direction finder the vessel was put through an 8-hr. endurance run during which she averaged 18½ knots at 5900 kw. on each main motor, and a 2-hr. overload run which gave an average of 19 knots and 6700 kw. The steering gear was tested hard-over to hard-over during these runs.

Between the two runs a crash-stop was made from full ahead to full astern at which the propeller came to rest after 66 seconds and then started to revolve in the opposite direction. The crash stop was then repeated, but in the ahead direction. Readings and recordings were also made on all equipment not previously tested, and the various instruments were checked and adjusted.

Arthur G. Leonard, Chief of Trial Bureau, Inspection and Performance Division, U. S. Maritime Commission, made the following statement at the completion of the trial: "The *Argentina's* performance was surprisingly good. The ship was subjected to the same type of exacting tests usually applied to new vessels, and she met every phase very satisfactorily."

Captain Thomas M. Simmons, master of the *Argentina* and her skipper since 1938, including her war duty, said: "I am perfectly satisfied with the performance of the *Argentina*. She is safer and better than ever, and met all of her tests in excellent fashion."

The following tribute was paid by Arthur Hiltebrant, general manager of Bethlehem's New York district shipyards: "The *Argentina* has fully measured up to our expectations. Her performance was smooth throughout and she achieved a speed of 18½ knots on her endurance run and a speed of 19 knots on her overload run. Even on the crash stop vibration was negligible. Delivery of the ship to her operators, the Moore-McCormack Lines, on schedule in the face of the many problems created by the record snow storm in New York City, is a tribute to the men of the 56th Street Yard who worked round the clock and through the week-end to complete the vessel before the close of 1947."

After the completion of the trial trip, the *Argentina* resumed her old run to the East Coast of South America, on January 15. Her itinerary includes Rio de Janeiro,

(Please turn to page 94)

POLLUTION OF NAVIGABLE WATERS

By HOWARD G. WALTERS, Civil Engineer
Harbor and Shoreline Section
Corps of Engineers, Department of the Army

Prevention of pollution of the navigable waters of the United States, especially in Southern California, is a serious problem, requiring the continuous effort and close cooperation of Federal and State authorities in keeping the public informed concerning the laws and needs relative thereto, and in enforcing said laws.

Pollution of the waterways, including all streams, lakes, rivers, their tributaries, and the ocean, is a direct or an indirect result of population. As a country develops, its population and business growth is closely paralleled by the growth of those factors which tend to increase pollution of inland and coastal waters. Industrial waste matter, refuse, and sewage; mining waste and drainage water; disposal of garbage and many other such waste matter, entailed by a high standard development of both population and resources, cause corresponding increase in pollution problems. The increase of pollution of the waters has been gradual and largely unnoticed for many years. As is usually the case, until the needs of the population become urgent and a public demands its abatement, little is done. Public demands generally result in the enactment of needed pollution laws, or their revision, and insistence in their enforcement. Of the various laws that have been enacted by cities, counties, states, and the Federal Government, this article considers only existing Federal laws concerning pollution of navigable waters, the enforcement of which are within the jurisdiction of the Corps of Engineers, Department of the Army.

Congress, in 1938, passed a bill commonly referred to as an "Anti Pollution Bill." This measure was not an enactment prohibiting pollution, but rather an act to provide for extensive and costly study of pollution problems and for grants and loans to local agencies for the construction and installation of improvements designed to prevent pollution. The President vetoed this bill because he disapproved the manner of granting Federal money to local agencies for pollution abatement projects. He did, however, approve the principle of pollution abatement and requested that Congress further consider this subject.

Pollution of navigable waters of the United States has, under existing laws, been unlawful since the passage of the Act of March 3, 1899. Section 13 of this Act makes it unlawful to place in, or to permit to be placed in, the navigable waters of the United States any refuse matter of any description, except that flowing from streets and sewers and passing therefrom in liquid state, whereby navigation shall, or may be impeded or obstructed. Further, the limitations extended to the placing or deposit of any refuse on the bank of any navigable water or tributary thereto from whence it can float or be washed into the navigable waters by tides, floods, or storms.

In 1924, Congress passed what is known as "The Oil Pollution Act." This Act makes it unlawful for any person to discharge, or permit to be discharged, oil by any methods, means, or manner into or upon the coastal navigable waters of the United States from any vessel using oil as fuel for generation of propulsion power, or any vessel carrying oil thereon in excess of that necessary for its lubrication requirements. It is to be noticed in this connection that the law concerns only oil pollution from vessels.

I might define Navigable Waters of the United States, since the laws under discussion are applicable only to such waters.

The Federal Court decision states that: "Coastal waters, rivers, and lakes are navigable in law which are navigable in fact, and they are navigable in fact when they are used or can be used in their ordinary condition as highways for commerce upon which trade and travel are, or may be conducted in the customary modes of trade and travel on waters, and when they are connected with, or extend to waters of another state or foreign country."

In connection with pollution of coastal waters, the question arises as to the extent of Federal jurisdiction. It is the present practice of the Corps of Engineers, Department of the Army, to include within its jurisdiction the coastal waters of the United States to such distance seaward as may be necessary to give full effect to the laws for the protection and preservation of the navigable waters of the United States. This distance is not controlled by any special limitations of three or twelve miles which may have been set up for other purposes. This practice is an assertion of the right of Congress to prohibit the doing of anything which tends to destroy the navigable capacity of any of the waters of the United States. This extended jurisdiction is applicable only to American vessels. The jurisdiction of the United States over foreign vessels, in cases of pollution occurring seaward of the three-mile limit, has not as yet been settled by treaty, as required by international law.

It might seem that the navigable waters, particularly the ocean, are so extensive that pollution would be inconsequential. Unfortunately, this is not the case. Oil and refuse discharged at sea are carried by winds and surface currents for many miles and may eventually float into harbors and wash ashore on the beaches. Experience indicates that in order to prevent pollution of the beaches, oil must be discharged not less than fifty miles offshore, and garbage should be dumped not less than eighteen miles offshore.

Oil and refuse discharged into harbors have little

chance to be carried out to sea, and, if not cleaned up promptly, they spread and wash onto the harbor shores, cling to boats and piling, or in the case of refuse sink to the harbor bottom.

In southern California particularly, where the beaches are used for recreation by a very large number of people throughout the year, the presence of refuse, garbage, oil, and sewage washed onto the shores, presents a very serious problem, since such wastes are highly objectionable. Oil has been known to so pollute a beach that for days at a time bathers have found it unpracticable to use it. No one likes to picnic on a beach or swim where there is oil or garbage such as grapefruit and canteloupe rinds, empty crates, or old onions, and other refuse, or near a sewer outfall. Oil is most objectionable to bathers, as it sticks to the skin and bathing suits and is usually very difficult to remove. The condition of sewage discharged into the water may be somewhat improved by screening, but it has been reported that screening removes only 5 per cent of the solids, leaving 95 per cent to be deposited on the ocean floor, or washed ashore in a more or less objectionable form. Beaches that are frequently or regularly polluted, particularly those near sewer outfalls, are in general shunned by the public.

Within harbor areas, pollution creates an unsanitary and unsightly condition, and sometimes a serious fire hazard. Floating oil discolors paint on ships' hulls and necessitates their frequent cleaning or repainting. Gases released by decaying refuse have a deleterious effect on paint and hulls of vessels and other metal objects, and is offensive to the public.

Floating oil at times so fouls the plumage of sea birds as to prevent their flying, and thereby causes their death. It also has an adverse effect on fish life, apparently causing an oxygen deficiency, which in turn causes migration from areas frequently polluted. Thus, there is ample reason for the enactment and strict enforcement of pollution laws.

The Corps of Engineers is assisted in the enforcement of the Federal pollution laws by the United States Collector of Customs and other revenue officers, such as the United States Coast Guard. Prosecution is handled by the United States District Attorneys. In the Los Angeles District, the Coast Guard cooperates fully, and patrols are alert to detect and apprehend violators of the pollution laws. The Coast Guard reports all cases to the District Engineer, and the cases to be prosecuted are in turn forwarded to the United States District Attorney for appropriate action.

The State laws concerning pollution are more inclusive than the Federal laws. The enforcement Division of the State Fish and Game Commission is very active in detecting and arresting violators. That agency cooperates fully with the Corps of Engineers and the United States Coast Guard. These agencies notify each other when cases occur, and members of the two agencies serve as witnesses for either or both State and Federal cases, where at least two witnesses are required.

Obviously, there are two types of pollution—deliberate and accidental. The dumping of garbage and other refuse, the disposal of sewage, and the discharge of oily bilge or ballast water into the navigable waters are generally deliberate. The spilling of oil while loading or unloading vessels and the breakage of oil pipe lines so that oil is carried onto the navigable waters, etc., are usually accidental. The deliberate type of pollution can be readily avoided. The accidental type is more difficult to prevent, but the use of adequate equipment, its careful inspection, and the institution of proper procedure and training can

Top to bottom:

Southern California beach, temporarily ruined for recreational use by oil which was discharged in violation of Federal and State Pollution laws.

Overflow of ships' fuel oil tanks causes serious fire hazards in the harbor areas.

Trash and oil on harbor waters constitute a serious fire hazard as well as creating unsightly and unsanitary conditions in slips, around floats, and under piers.

greatly reduce the number of accidents.

Although designated by law as the "enforcement" agency, the Corps of Engineers takes the attitude that it is better to prevent pollution than to apprehend and successfully prosecute violators. Although strict about enforcement, since the law is mandatory, the Corps attempts to secure cooperation in the installation and operation of proper equipment and the promulgation and enforcement of rules and regulations to reduce pollution. Semi-monthly inspections of the navigable waters of Los Angeles and Long Beach Harbors are being made.

In many cases, the Corps of Engineers, frequently in cooperation with the State Fish and Game Commission, holds conferences or consults with individuals, concerns, or agencies whose operations involve pollution hazards, concerning proper methods and equipment to prevent pollution. The Corps of Engineers, of course, is not empowered to require installation of equipment or prescribe operating regulations, but it is eager to assist in considering such matters if the persons or agencies involved so desire, which is frequently the case.

One of the latest cases of cooperation on a large scale is in connection with the fish-canning industry, at Los Angeles and Long Beach Harbors, wherein bilge and waste water from the fishing boats and fish refuse from the canneries was therefore discharged directly into the harbor waters, creating a most undesirable condition. Since the matter of pollution and its prevention has been called to their attention by both the State and Federal Government, equipment is being installed to alleviate the pollution problem. The importance of keeping fish oil and solids from the sewers has been emphasized, and screens and centrifuges are being installed for their removal for that purpose. The Port of Hueneme was closed to fishermen until a fish refuse disposal plant was placed in operation.

The cooperation of the major oil companies in preventing pollution has been most satisfactory. Practically all of the oil-loading docks now have special equipment for the prevention of pollution, and some have special booms for use in surrounding oil spills. In some cases, the procedure in loading oil has been modified so as to reduce the liability of pollution, and most companies now carefully plug all vessel scuppers, while in port, in order to prevent oil spilled on deck from flowing overboard. Most oil companies now require their ships' masters to dump bilge and ballast waters at least fifty miles offshore. Crews of vessels and shore facilities are provided with equipment for, and have been instructed in methods of localizing and removing oil spills so that, although pollutions may occur, they will not spread and become a general nuisance and hazard over large areas.

To prevent refuse and garbage pollution, some ships have installed locked receptacles wherein all such materials are placed while the vessel is in port, and which can be unlocked to permit disposal of the material only by responsible employees, who are instructed that refuse shall not be dumped until the vessel is at least eighteen miles offshore.

Studies of industrial waste pollution have been made by various Federal and State agencies and by some industries through their national association. As a result of these studies, a number of industries have made plant changes for re-circulation and reuse of waters formerly wasted, or for recovery processes which salvage waste products of some value.

The most serious water pollution by industrial wastes results from the manufacture and finishing of various textile products, pulp and paper, coke and gas, leather, sugar, certain chemical products, operations in which distillation is a process, the canning of food, the preparation of milk and milk products, slaughtering, and the preparation of meat products. Still other substances of a polluting character are acid waters from refineries, brines from oil-field operations, waste water from the refining of petroleum products, and wastes from the manufacture of rubber using reclaimed material.

The factors which have militated in the past against the prevention of water pollution by industrial wastes are:

a. Lack of coordinated effort and of proper organization to obtain cooperation between industry and municipalities.

b. Failure of municpalities to participate in a comprehensive program for the prevention of water pollution.

c. Lack of uniformity in the prevention of water pollution by industrial wastes, resulting in unfair competition when strict regulation in one State gives an advantage to industry in another State.

d. Lack of effort on the part of industry to study methods within the plant for the reuse of waste water or the salvage of by-products of possible value.

e. The cost of changes in methods of plant operation for the reuse of waste water or the salvage of by-products of possible value.

The Corps of Engineers, in order to inform all persons concerning Federal pollution laws and to call to their attention the need for preventing pollution, has issued notices to all steamship companies, vessel owners and operators, shipping concerns, oil companies, terminal and dock operators, and other agencies whose activities may involve pollution hazards. All such parties have been requested to post and bring these matters to the notice and attention of all employees.

The District Office has also published and distributed an illustrated booklet on the subject of pollution and its prevention. This booklet describes the harmful effects of pollution, the causes, and means of prevention, and quotes the pollution laws. And it is intended that by illustrating the various facts, the steamship companies, shipping agencies and others would have a convenient means of calling the attention of all employees to the pollution problem, and that cooperation in this matter would thereby be considerably advanced.

Since 1936, the Corps of Engineers, Los Angeles Engineer District, has investigated 240 oil pollution violations in the Los Angeles-Long Beach Harbor area. Most of these cases consisted of oil spills from vessels loading

(Please turn to page 96)

Stability and Trim Experimental Tank

By JOHN H. La DAGE[1]

John H. La Dage

Stability, the stepchild of nautical science, is at last achieving prominence commensurate with its importance. Recently completed at the United States Merchant Marine Academy at Kings Point, N. Y., the Stability and Trim Experimental Tank is being used to highlight in a vivid and accurate manner the theories of ship's stability and trim. The Tank and its use are unique since prospective merchant marine officers have never before been given an opportunity to observe visually the results of loading and flooding a merchant vessel and to study methods of correction for poorly loaded and flooded conditions.

The trim of a vessel, since it is immediately apparent to the observer and is of everyday concern in the operation of a vessel, is customarily given more attention by the ship's officer than the stability of his vessel. Poor stability, either excessive tenderness or stiffness, is not noticed while loading unless the vessel is loaded so poorly that a list develops. At sea, the behavior of a vessel is often attributed to the fact that she is a "poor roller" or to the fact that severe rolling just cannot be helped. This unawareness of stability has led many officers to the belief that a study of stability is not entirely necessary and merits only a few hours of time in order to be able to answer questions given by the Merchant Marine Inspectors on Chief Mate's and Master's license examinations. Fortunately, however, in the past few years a growing concern by the Maritime Commission and certain steamship companies in seeing that their officers acquire a thorough knowledge of stability principles has manifested itself. Their concern is not primarily due to the fact that vessels are occasionally lost due to a lack of knowledge of stability by the operating officers (as important as this fact may be) but principally to the fact that overly stiff vessels roll sharply in heavy seas leading to topside damage while overly tender vessels are apt to take aboard an unnecessary amount of water when rolling in heavy seas, once again leading to damage.

The reasons underlying the establishment of a Stability and Trim Experimental Tank by the Department of Nautical Science at Kings Point are to demonstrate vividly how poor distribution of weight, both vertically and longitudinally, lead to the unfortunate sea conditions of a vessel referred to above; and more important, what can be done to alleviate these conditions. A laboratory term has been set aside in the course in Naval Architecture for both deck and engine Cadet-Midshipmen where the experiments described below can be demonstrated. Cadet-Midshipmen participate actively in these experiments.

[1]Senior Instructor in Naval Architecture at the United States Merchant Marine Academy. Lt. La Dage is co-author of the textbook *"Stability and Trim for the Ship's Officer"* by La Dage and Van Gemert, and an Associate Member of the Society of Naval Architects and Marine Engineers.

Description of Facilities

Facilities may be divided roughly into three groups: The tank, the model, and auxiliary gear.

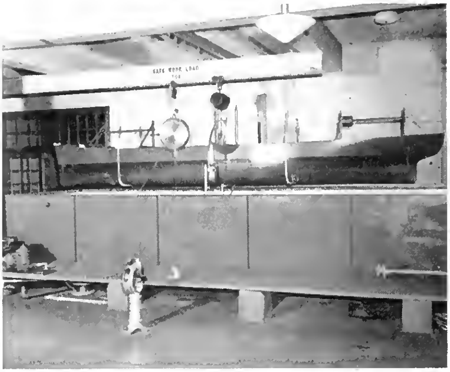
The tank is some 23 feet in length, 7 feet in breadth, and 3 feet deep; and is constructed of steel plating with appropriate stiffening. Piping consists of a filling line and drain line, and necessary valves. A water meter is provided on an offshoot from the filling line and is used to obtain the volume and weight of water when the model is flooded for certain damage calculations.

The model, which is of merchant form, was given to the Academy by the U. S. Navy Bureau of Ships and was used in the David W. Taylor naval towing tank at Carderock, Md. for damage stability studies during World War II. Tank, equipment, and procedures were designed and devised by Academy personnel. The model glories in the name of *"T. V. Miss Calculation,"* a name which at once defines her purpose and misdefines her use. The humorous touch, however, has proved very popular with the Cadet-Midshipmen and can be used to advantage to make the study of theory more inviting. *Miss Calculation* cannot be considered as a dainty lady, however, since she has a rather large and bulky form as her principal dimensions and characteristics reveal:

T. V. Miss Calculation—Principal Dimensions and Characteristics

Length overall	20′11⅞″
Length between perpendiculars	20′00″
Beam	2′10″
Depth	1′10¼″
Sheer forward	5⅛″
Sheer aft	2⅞″
Camber	Zero
Draft, loaded	1.′02″
Draft, light	5.7″
Displacement, loaded (F.W.)	2825 lbs.
Displacement, light (F.W.)	1035 lbs.

Miss Calculation is subdivided into five compartments. Nos. 1 and 5 are fitted with supports for accommodating 13 one-hundred-pound lead weights. These weights can be moved up vertically by the use of wooden blocks. Nos. 2, 3, and 4 compartments are available for flooding. There is a double bottom tank under each of these com-



View of the stability and trim experimental tank at Kings Point. The model is secured by lifting it out of the tank and adjusting slings fore and aft Visible are: Dynamometer scale, pulleys, drum, inclining sectors, chain hoist, angle indicator (on bulkhead), brass compensating weights in inclining lines, water meter, inclining experiment tracks and cars, and topside ballast weights.

partments; No. 2 has a deep tank, and No. 3 has two wing tanks. Each tank has one or more flooding ports closed by rubber plugs. When these plugs are removed, flooding conditions involving free communication with the sea can be easily simulated. The tanks can also be flooded from above by use of a hose which is attached to the water meter. No. 4 compartment can be fitted with permeability blocks. These blocks serve to illustrate the effect of water-excluding objects within a vessel on the damaged stability.

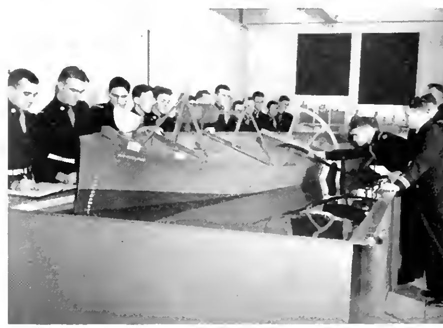
In addition to the hundred-pound weights, supports are provided above decks accommodating twenty-five, ten, and five-pound weights. The supports are so constructed that the weights can be shifted both vertically and longitudinally, thus adding flexibility to the methods of shifting the center of gravity of the model.

Miss Calculation is equipped with a complete set of

Cadet-Midshipmen load a hundred-pound lead ballast weight into No. I compartment on the model, Miss Calculation.

plans including: (a) Curves of Form (Displacement, Tons per inch immersion, Metacenter above base, Coefficients of fineness, etc.) (b) The Lines Plan (c) Cross Curves of Stability and (d) General Arrangement Plans. Thus, the Cadet-Midshipmen are working under conditions which almost exactly simulate conditions as found aboard ship. Using the above plans and discovering that their predictions based on the use of the plans and calculations are borne out in the condition of the model gives the Cadet-Midshipmen confidence in their knowledge.

Statical stability curves can be drawn up by inclining the model and ascertaining the value of her righting arms and moments at various angles of inclination. The methods used in inclining *Miss Calculation* and measuring the force required and the angle of inclination are interesting. Sectors with circular arcs are bolted to a collar which fits around the midship section. Lines are led from these sectors through pulleys to a drum. When the handles on the drum are turned, a dynamometer scale registers the force of the couple which is inclining the model. The force on the scale can be easily converted into the righting arm or righting moment of the model. The

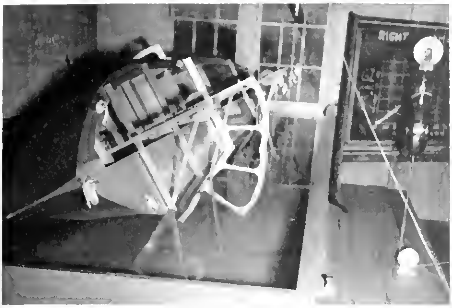


Kings Point Cadet-Midshipmen observe the list caused by flooding a compartment of the model, Miss Calculation. Lt. G. N. Steiner supervises

angle of inclination is indicated on a linear scale which slides past a cross-hair as the model inclines and slacks off a line attached to the inclining sector and led through pulleys to the sliding scale. Thus, the stability of a vessel at various angles of inclination and for different conditions of loading is quickly and easily demonstrated.

Gear is provided for a realistic inclining experiment. On shipboard, this method of locating the center of gravity of the vessel is accomplished by winching a car loaded with heavy weights across tracks which have been built up transversely across the deck; observing the small angle of list induced by means of a pendulum; and using this data along with the displacement of the vessel to calculate the center of gravity. This method is followed out almost exactly with *Miss Calculation*. Small cars with lead weights run across tracks built up on a wooden base, and a pendulum located on the bow where it can be easily observed serves to find the tangent of the angle of inclination.

Incidentally the center of gravity of the model is some-



Miss Calculation is heeled over to a fifty degree angle of inclination. In the background, right, the statical stability curve for this condition is seen. The model in this condition has just achieved her maximum righting power or stability. This is usually associated with the angle of deck edge immersion, as the picture shows.

what lower in *Miss Calculation* in relation to her depth than would be the case with a merchant vessel of similar form. This is due to the lack of superstructure on the model. However, the model can be made unstable very easily by loading a few hundred pounds of weight on the topside supports.

One of the most vivid demonstrations is the effect of free surface of water on the model's stability. Once a Cadet-Midshipman has seen the model, which prior to the flooding of just one compartment was floating upright with considerable stability, caused to list heavily due to such flooding, he will never forget the danger of free surface of liquids aboard his vessel. In the typical demonstration reproduced in this article it can be seen that a positive GM of 1.29 inches is converted to a negative GM of 0.22 inch by flooding just one hold. The consequent list is entirely due to the free surface effect since the weight of liquid is loaded at the center of gravity and the change in the position of the metacenter is not considerable.

Corrective measures for list rank high in the demonstrations performed on *Miss Calculation* since the correction of list due to negative initial stability is one of the most commonly misunderstood concepts of both students and ship's officers. A list due to negative GM cannot be corrected by pumping water or shifting weight from the listed side to the high side; not only that, but if an attempt to do so is made, it is entirely possible to cause the capsizing of the vessel. There is only one practical method of correcting list due to negative GM:—Get the center of gravity *down.* Once again, the actual observance of a ship-formed model capsizing when the wrong method of correction is used is sufficient to implant a mental picture which he will never forget in the mind of a young cadet.

A partial list of experiments and demonstrations which are performed includes:

1. Displacement experiment, showing that a vessel displaces a weight of water equal to its own weight.
2. The three equilibriums, showing the three conditions of initial stability; Stable, Neutral, and Unstable Equilibriums.
3. List due to (a) unsymmetrical loading (b) negative initial stability and (c) combination of unsymmetrical loading and negative initial stability.
4. The Inclining Experiment, showing the method used to obtain the position of the center of gravity of a vessel.
5. Construction of statical stability curves for a vessel at various drafts and with various positions of the center of gravity; correction of the curves for vertical and transverse shifts in the position of the center of gravity.
6. Effect of form (beam, freeboard, coefficients, etc.) on stability.
7. Free surface, showing the effect of free surface of liquids on stability at small and large angles of inclination.
8. Flooding with free communication with the sea; without free communication; effect of intact buoyancy; effect of surface and volume permeability.
9. Trim demonstrations, including:
   (a) Calculation of drafts after longitudinal shifts of weight.
   (b) Loading and discharging.
   (c) Effect of the position of the tipping center (center of flotation) on trimming moments.
   (d) Effect of out-of-trim conditions on displacement readings.
   (e) Loading so as to change draft at one end only.
   (f) Effect of trim on transverse stability.

In addition to the above routine experiments, the Cadet-Midshipmen are encouraged to conduct their own experiments on any phase of ship's stability or trim which appeals to them. This practice proves particularly interesting and valuable to the Cadet-Midshipmen.

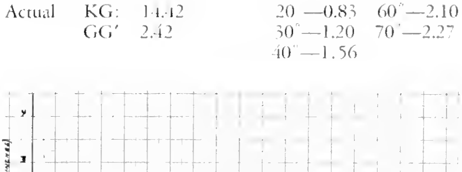
Typical Demonstration

The following demonstration is reproduced here in order to show how the demonstrations are conducted and

Demonstration II—Free Surface Displacement Condition 2(c)

Displacement: 1800 lbs. KG: 14.4 inches

			Correction to Righting Arms	
Assumed	KG:	12.00	10°—0.42	50 —1.85
Actual	KG:	14.42	20 —0.83	60°—2.10
	GG′	2.42	30°—1.20	70°—2.27
			40°—1.56	



(Please turn to page 88)

- - With The

George W Curran

Port Engineer of the Month

LOS ANGELES

GEORGE W. CURRAN

OF AMERICAN PACIFIC STEAMSHIP CO.

George W. Curran was born in San Francisco and went to school in San Francisco and Richmond. He served his apprenticeship in the Berkeley shops of Byron-Jackson, and spent the years from 18 to 22 on all types of machine tools and erecting.

At 22 George went to sea with the Pacific Mail (later became Dollar Line) and sailed on the first of the President 'Liners, *President Pierce* (passenger and freight) as oiler and water tender. His second ship was the freighter *West Holbrook,* then back to the *President Pierce* as refrigeration engineer and licensed junior engineer. His chief on the *Pierce* was Jack Penberthy, now with the Bureau of Marine Inspection and Navigation in Honolulu.

At 24 he moved on to the Grace Lines' *West Kasson* under the well-known chief engineer, E. T. Senter, now marine superintendent of that line. Later when the freighter *West Kasson* changed its name to the *Cuzco,* George sailed as 3rd assistant and finally 2nd assistant where he remained for one year. Then with Union Oil on the tanker *Los Angeles* for 1½ years as 3rd assistant, 2nd assistant and then 1st, his chief being Louis Eakins, now with the Maritime Commission in San Francisco. For the next five years with Grace again on the tanker *Nora* as 1st assistant and chief. After the *Nora* was sold, he had the freighter *Coya* for two years and *Charcas* for another two years.

The next phase was spent on the eastern coast where he joined the crew of the new C-2 (one of the first C-2s) *Red Jacket,* which later became the *Santa Monica,* for

In October 1941 George returned to the West Coast and joined Bethlehem Shipyard as marine machinist supervisor on new consrruction, where his job was on the installation of machinery in destroyers, and he transferred to repair in 1942. He remained at Bethlehem until September 1944 at which time he went with American Pacific. Here he became marine superintendent and had as his superior Paul V. Gaudin, Superintending Engineer. His next promotion made him Assistant Superintendent Engineer, which job he holds today.

George Curran is mighty popular down Los Angeles-Long Beach Harbor way and is very well liked and respected by all marine men. He is a very active member of the Society of Port Engineers and I can't think of a single meeting that he has missed.

JOE WOSSER ELECTED

JOE WOSSER, new president of Society of Port Engineers, Los Angeles. He succeeds Leonard E. Landers who has been transferred by his company to San Francisco.

Port Engineers -

HERBERT MOORE ELECTED PUGET SOUND PORT ENGINEER PRESIDENT

The Society of Port Engineers of Puget Sound elected Herb Moore, Matson Navigation Company, as its president for 1948. Sidney R. Smith, American Bureau of Shipping, was named vice-president, and Alex Stewart was unopposed as secretary-treasurer.

Mickey Felton, Alaska S.S.; J. W. Elkins, Board of Marine Underwriters; and Howard Lovejoy, Puget Sound Freight Lines; were elected to the board of governors. Merle Johnston, Olympic S.S., was named a member of the board to fill Moore's unexpired term.

Al Mades, Pacific Marine Review, disguised himself as Santa Claus for the Christmas portion of the evening and distributed the presents. A feature of the program was movies taken at the port engineers' picnic a few months ago. These films, taken by Quent Herwig, Marine Service, were shown by Howard Lovejoy.

Louis Dial, ATC, spoke briefly regarding his inspection of the wreck of the Clarksdale Victory.

LEONARD E. LANDERS

New Assistant Superintending Engineer of A P L at San Francisco

George Jackson

Port Engineer of The Month

SAN FRANCISCO

GEORGE JACKSON
OF AMERICAN PRESIDENT LINES

With a seagoing career of 27 years chalked up in his "personal logbook," George Jackson, who today is superintending engineer for American President Lines, came ashore in 1942 to become assistant to the man he has now succeeded.

Born in 1890 in San Francisco, George Jackson's first trip to sea was in 1915 for the old Pacific Mail Line. Later with the Dollar Line, and then for American President Lines, Jackson continued to serve as a marine engineer until May, 1942.

At that time he left the sea, but did not leave ships, when APL picked him for the post of Assistant Superintending Engineer with headquarters in San Francisco. In this job, Jackson served under the veteran and colorful John Jacobsen. Upon Jacobsen's retirement at the end of 1947 George Jackson was promoted to the top APL engineering post—Superintending Engineer. His office is at Pier 44.

Jackson's first job at sea was as oiler on the famous old Pacific liner, *Korea.* Sometime later he shipped on the *Manchuria,* which afterward was renamed *President Johnson.* His first berth as chief engineer was on the *President Lincoln* in 1921. He also has been chief on the *President Pierce, President Jackson, President Taft* (old), *President Hayes* (new), and *President Polk* (new).

Frank Cavanaugh

FRANK CAVANAUGH SPONSORS L.A.-L.B. ELECTION MEETING

The January meeting of the Los Angeles-Long Beach Society of Port Engineers, sponsored by the Frank Cavanaugh Machine Works, included the election of officers. New officers and directors are President—Leonard Landers, American President Lines (since resigned); Vice-president—Joe Wosser, Matson Navigation Co. (since elected president); Secretary-treasurer—Bert Hale, Marine Solvents Service Corp.; Vice-secretary-treasurer—G. "Alex" Robinson, Long Beach Marine Repair Co.; Directors—Glen Gulvin and George Curran, American Pacific S S. Co.; M. H. Kelley, Richfield Oil Corp.; Dan Dobler (Board Chairman), The Texas Co.; C. V. Peterson, The Texas Co.; and Fred Cordes, Deconhil Shipping Co.

Shown in the above photo are, left to right: Frank Cavanaugh, Cavanaugh Machine Works, R Risher, Asst. Mgr., Construction & Repair on Navy Tanker Conversion, Standard Oil of New Jersey; Bill Anderson, Keystone Shipping; Andy Ells, San Francisco, Pacific Coast Division, Maritime Commission; Dan Dobler, Texas Oil Co.; Joe Hare, Maritime Commission; George Curran, American Pacific; Stewart Small, Cavanaugh Machine Works, Bert Hale, Marine Solvents Corp.

Following the invitation to the Pacific Marine Review to attend and report the meetings without limitation, more lengthy technical coverage of the meetings will hereafter be provided than has heretofore been possible.

Stewart Small

Annual Banquet of Society of Port Engineers of Puget Sound held in Seattle January 16. Left, front to back, L. D. Beardsley, Todd Shipyards Seattle Division; Mrs. A. E. Farr; Robert G Zener, Gen. Mgr., Todd Pacific Seattle Division; Mrs. L. D. Beardsley; Lynton Jordan, Pacific Tankers, Inc. Right, front to back Philip Spaulding, Todd Shipyards Seattle Division; Mrs. Robert G. Zener; A. E Farr, Todd Shipyards; Mrs. Philip Spaulding; Al Copp, Northwest Ship Repair. Right, background Gil Ackerman, Operations Mgr., American Mail Line.

*Water Treatment in the Marine Field

By DR. R. C. ULMER

Technical Director, Power Chemicals Division

E. F. Drew & Company, Inc.

Dr. R. C. Ulmer has had wide and varied experience in the field of chemistry, especially that concerned with power plants. Following the receipt of his AB degree at Ohio State University, he was employed by the Columbus & Southern Ohio Electric Co. in 1930. A Fellowship at Ohio State University was followed by the receipt of his PhD. degree after which he was employed by the Detroit Edison Co. In the Chemical Division of the Research Department of this company he had experience with the diverse problems involved in the operation of power plants. In 1945 the author joined E. F. Drew & Co., Inc., as Technical Director of the Industrial Department. He is at present in charge of all water treating problems and research and development of water treating products for that company.

Dr. Ulmer is the author of many technical papers and holds membership in the following technical and engineering societies: The National American Chemical Society and The Chemists Club of New York, American Society for Testing Materials, American Society of Mechanical Engineers and the National Association of Power Engineers.

Great advances have been made in recent years in water conditioning and it is no longer necessary to tolerate just fair conditions in marine boilers. Scale and corrosion-free boilers and steam of very high quality are rightly to be expected from good water treatment. In order to accomplish these objectives, a proper water treatment must be selected, but just as important if not more so, the treatment must be controlled and used properly.

*Delivered before the San Francisco Port Engineers on December 3, 1947.

Boiler Design

Although it is realized that boiler design has much to do with water treatment problems, this subject is not dealt with in this article since an article itself might be written about this problem. Boiler design may have a tremendous effect on carryover, bad circulation of water and steam, etc. The latter difficulties may lead to overheating and tube failures. Fortunately if a treatment will work for one type of boiler it will work for another type in general or at least treatment can be modified slightly so that it will apply. The same is true of operating pressure and operating characteristics. That is, only a slight modification of a basic treatment usually is required to meet the situation.

Objectives of Water Treatment in Marine Industry

The problems in the marine field are essentially the same as those in the industrial field with the exception that they are aggravated somewhat by salt water contamination. The chief problems encountered are:

1. Scale and Sludge.
2. Corrosion and caustic embrittlement.
3. Foaming and priming or carryover.

Corrosion

Corrosion difficulties in the boiler can usually be

(Please turn to page 98)

Left to right: R. C. Ulmer, technical director; Norman McLeod, service engineer; Jack Churchill, Pacific Coast manager; J. J. Lewis, service engineer; all of E. F. Drew & Co.

Pacific World Trade

Reg. U. S. Pat. Off.

SAN FRANCISCO'S FOREIGN TRADE ZONE

By ROBERT H. WYLIE, Port Manager

Editor's Note: For years San Francisco export-import interests have been endeavoring to get governmental approval for a so-called foreign trade zone; that is, an area to which commodities may be imported and sorted, processed, mixed or stored and then re-exported without the payment of customs duty until such time as they may be brought "into the country" by delivery beyond the boundaries of the zone. New York and New Orleans have such zones, and San Francisco is now awaiting final approval by the Foreign Trade Zone Board to plans already approved in a preliminary way. This final approval is expected at any momenr. General Wylie has had an important part in bringing this project to fruition.

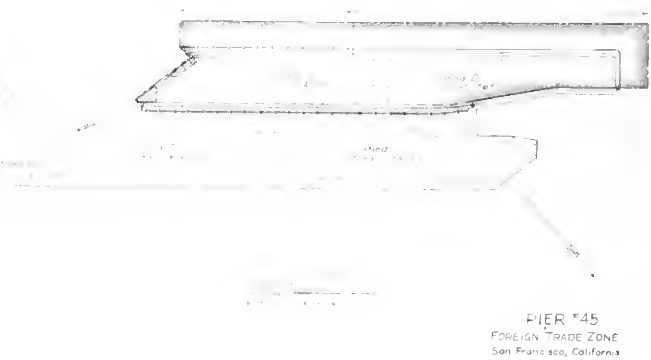
The sketch shows the layout of Pier 45 with the boundary of the initial Foreign-Trade Zone area indicated both from the standpoint of the technical or legal boundaries and of the fence which is the physical barrier. Obviously the free zone area including water is appreciably larger than the land area which is enclosed

San Francisco Pier 45—Site of proposed Foreign Trade Zone.

but it also comes under the designation of Foreign-Trade Zone territory so that the boundary is the legal line on water or land which separates the Zone from U. S. Customs territory. This fact must be thoroughly understood to appreciate the difference between a Foreign-Trade Zone and any form of bonded warehouse or storage facility. For security reasons (proximity of the inner portion of Berth B, Pier 45 to Fishermen's Wharf area) no attempt will be made to use this berth for ships bringing cargo to the zone. It was first contemplated that the doors leading on to the apron would be sealed but it was later determined desirable to place the fence on the outer edge of the apron thus permitting the use of this additional space for storage or processing of commodities that do not require protection from the weather. This will materially increase the operating space available although it must be noted that one of the two railroad tracks on the apron must be kept free in order to permit switching cars to berth D.

Shed D, and the apron alongside the shed, will be the ship berth for the zone. This will accommodate one large vessel as there is sufficient space to accommodate the largest cargo ships in operation, or two vessels of the Coaster type. Several of the doors in the southeast portion of Shed D will be open and available for direct loading to cars on a low level track. The doors in the northeast area of Shed D will be sealed since it is not practicable to put a fence between these doors and the structure of the car float slip. Should volume of business warrant the inclusion of additional space on Pier 45 into the zone, one proposal contemplates the removal of this slip which will not only give considerable additional space but will make possible the opening of all the doors on that side of the shed.

Shed B will be used primarily for storage and manipulation of goods in the zone. In this shed there will be the offices of the Zone, U. S. Customs and of other tenants such as packers, cleaners, sorters, bottlers and other businesses that may have work in connection with the operation of the Zone. It will be noted that this area will permit loading of cars on the low level tracks to the east of the shed or on the high level tracks to the west. Trucks may be loaded either inside the shed or outside on either side. The fence around the area will be patrolled by Customs' Guards to prevent unlawful passage of goods from the Zone to U. S. Customs territory. It should be pointed out that the presence of these guards and of this fence will not prevent the use of the pier for business other than foreign trade zone activities although it is hoped that the zone will be so active that outside business, other than Foreign Trade Zone, need not be encouraged. The area of some four acres, judged by some standards, does not appear large but it is adequate to care for a very considerable volume of goods and when there is an indication that its capacity will be exceeded the Zone may be expanded—first by taking in the remaining sheds A and C, then filling in the space where the car float slip is now located and then expanding into the area on the landward side of the pier until we would have some 20 acres of useful area.



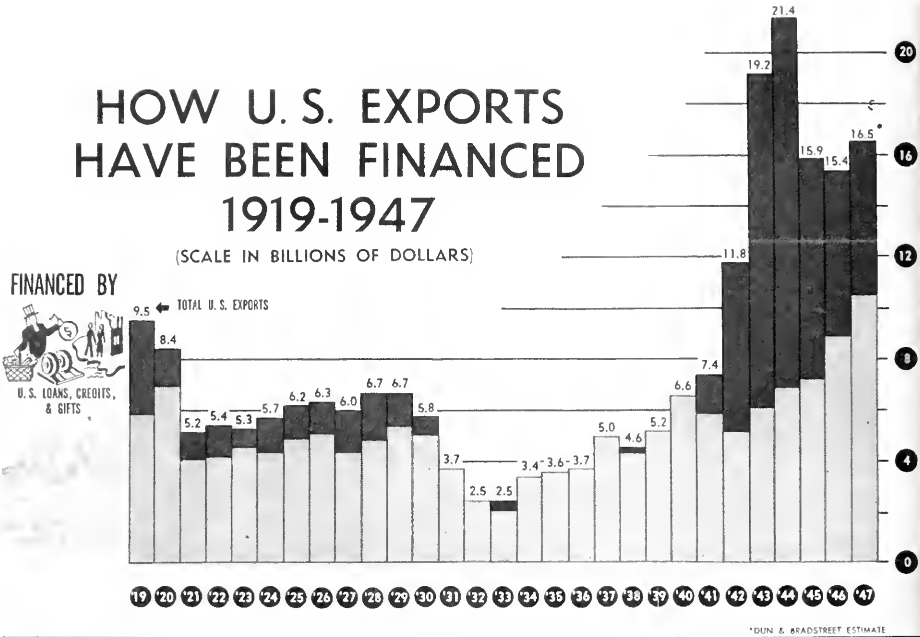
Pier 45. The Zone layout is the shaded area. Compare this sketch with the photo on page 56 and note that the ship in the photo would stand along the top of this sketch and within the Zone.

It will require some considerable time to get the activities under way to the extent that we may determine what the trade will actually be, but it is imperative that all of those interested in the success of the Zone and of the port and world trade in general, realize that a foreign trade zone is a little known institution. It is essential that an active promotional and educational campaign be carried on in order to develop business for the Zone not only in order that it might be used but because of the stimulating effect it must have on commerce.

In New York and in New Orleans where the zones are in operation, a number of uses have been developed but undoubtedly there are scores of operations that would prove profitable or advantageous in such an establishment. It will require energy and imagination to explore the possibilities and develop new business. It is unlikely that the Zone will take any business away from any existing agencies. Therefore, it is a challenge to the ingenuity of the pro-zone enthusiast to go out and get new business.

HOW U. S. EXPORTS HAVE BEEN FINANCED 1919-1947

(SCALE IN BILLIONS OF DOLLARS)



THE ABOVE chart prepared by Dun & Bradstreet gives a comprehensive picture of our balance of trade.

Prior to 1942 the goods exported from the United States were largely paid for by imports. In many of these pre-war years all exports were balanced by a corresponding volume of imports; in some years exports were partly financed through loans and credits. Since 1942 over 50 per cent of all exports have been sent out as gifts or have been financed through loans and credits. Since the end of the war these gifts and credits exports have declined largely as a result of the virtual termination of lend-lease. With the sharp curtailment of lend-lease the volume of total exports declined but continued to be well above the level that existed from 1919 to 1940.

The 1947 estimate of exports is based upon U. S. Department of Commerce data covering the first ten months of 1947. In each of these ten months the exports of merchandise have been well above the corresponding 1946 levels. While the total volume of goods sent abroad in 1947 is greater than in 1946, the volume financed through loans, credits, and gifts has been declining.

The huge volume of exports during and after the war, while representing about 8 per cent of total United States production, constituted an enormous outlay in terms of goods and services. Part of these exports were paid for by imports of commodities and part were financed by the liquidation of foreign holdings including gold. Despite these payments, there was a considerable portion of all exports that were not covered by any immediate return.

Shipments of gifts on which no future return was anticipated represented more than half of the exports that were not paid for by imports or by liquidation of foreign holdings during and after the war. The remaining exports that were not sent as gifts and were not covered by any immediate returns were financed through credit.

In addition to numerous gifts from individuals and institutions, there were Government donations to UNRRA, shipments of civilian supplies to occupied countries, and lend-lease shipments. While lend-lease was originally planned to be conducted on a loan basis, the Government has since listed it as a unilateral transfer which is the same as a gift.

Most of the credit has been extended for exports since 1941 has been obtained from Government sources, foreign bond issues placed on the domestic markets generally have not attracted any large amounts of private capital. Loans from the United States Government, the International Bank, the Monetary Fund, and the Export-Import Bank have enabled many countries to purchase commodities from the United States. The International Bank took over the function of the Export-Import Bank to provide long-term reconstruction and development loans in May 1947. The Monetary Fund made dollars available to foreign countries for the first time last Spring.

JUNIOR WORLD TRADERS HEAR PENNINGTON

When Maitland Pennington began his campaign for organized sales effort for the promotion of Pacific Coast ports, many of those who heard him were diverted by his reference to particular instances of export and import percentages. So the Junior World Trade Assn. of San Francisco listened with keen interest to the explanation of such cases when he addressed its January meeting.

Out of this and other meetings with shipping groups, it is hoped that a program of aggressive advertising of Western ports will come, and that the advantages of such ports will more than offset the fear of labor troubles which other ports are using in their own sales efforts. The Junior traders are following all developments with the usual alertness.

Top—Arthur F. Burns, Joseph Harper, Barney Jager, Robert D. Hudson, Maitland Pennington. Center—Mortimer Gussett, Wm. J. Grijalva, Stewart M. Wellhouse, James R. Leland, Alan Logan. Bottom—Dennis M. Ryan, Stanley W. Mobbs, Wayne Hamilton, Joseph B. Carroll, Wm. W. Olheiser.

U. S. COMMERCIAL COMPANY QUITS

The U. S. Commercial Company, a subsidiary of the Reconstruction Finance Corporation, is rapidly going out of business and expects to close down about March 1.

The Company's work in Japan and Germany—handling the exports of these countries—terminated on December 31st. The only exceptions are silk and textile contracts that require more time to complete. A S.C.A.P. Foreign Trade Office has been opened by the Army to aid shippers interested in Japan.

The San Francisco Office of USCC has terminated its purchasing, warehousing and shipping of merchandise to the Ex Japanese Mandated Islands of the Pacific. The Company has been supplying over one hundred trade stores in the Marianas, Carolines and Marshall Islands with just about every commodity one would expect to find in the old fashioned country store. These trade stores are run by the Natives themselves and goods are paid for in U. S. dollars which the Natives have accumulated by working for the Navy Military Government, gathering, sacking and selling copra and seashells and producing Native handicraft. USCC bought these commodities from the Natives, then shipped them to San Francisco where they were sold to the local trade. Any surplus from sales was returned to the Islands.

The Island Trading Company of Micronesia has been formed in Guam by the Navy to take over the work of USCC. Their local representative is F. H. Tillotson, Vice President, with offices in the Naval Supply Center in Oakland. Frank Howland, Chief of USCC's San Francisco Office, and Harry Gunther, Assistant Chief, are returning to private business.

Export Exam:

Examining Prof.: "Give the amount of coal exported in any one year."

Student: "1942—None!"

New Import Regulations Announced For Netherlands Indies

Because infringments of the Netherlands Indies Foreign Exchange regulations have increased extensively in the past months, a new ruling has been imposed, effective February 1, 1948, requiring importers to obtain a certificate issued by the Department of Economic Affairs showing that the importation of such goods is in conformity with the foreign exchange regulations of 1940.

Smuggled goods and smuggled money into the Indies have resulted in the importation of steadily increasing quantities of inferior goods and "complete rubbish" sold in the country at "fancy prices", the announcement declared. The new measure aims at a more effective supervision of the present foreign exchange regulations.

To obtain the certificates importers are requested to supply all details relative to proposed imports to the Bureau for the Supply of Goods, Department of Economic Affairs, No. 8, Molenvliet West, Batavia, Java, issuers of the certificates.

The following extenuations of the regulations have been provided so that importers' difficulties may be obviated as much as possible:

During February and March, exchange permits issued *before* February 1, 1948, may be substituted for the certificate. But after March 31 the certificate must be produced at the Custom House even though the permit was issued prior to February 1.

In cases where permits are issued *after* February 1, the certificates will be granted with the permits.

Regulations for certificates described above do not apply to parcel post packages, travellers' luggage, commercial samples, etc. A separate regulation for these will be announced later.

Foreign Trade Zone for Los Angeles?

The Board of Directors of the Los Angeles Chamber of Commerce adopted the following recommendation:

"That the Board of Directors of the Los Angeles Chamber of Commerce favor the establishment and operation of a Foreign Trade Zone by the Los Angeles Board of Harbor Commissioners using the existing facilities recommended by the Leeds-Fitzgerald survey."

Pacific World Trade

1948 Officers of Foreign Trade Association of Southern California

At the annual meeting followed by a directors meeting of the Foreign Trade Association of Southern California the following officers and directors were elected for the year 1948:

Chairman of the Board, F. H. Beeman, A. T. & S. F. Railroad; President, S. J. Hindle, American President Lines; 1st Vice President, Philip Stein; Customs Attorney; 2nd Vice President, Roland C. Stevens, Transmarine Navigation Co.; Secretary, Manuel Avila, Attorney; Treasurer, A. M. Gaines, Farmers & Merchants National Bank.

Directors: R. D. Blanchard, Norman Dunnavant, Michael Harris, Norman Hewson, Stanley Lindo, T. R. Mojonier, H. W. Peterson, Alden T. Ross, T. R. Stetson.

Executive Secretary, George Spillenaar, and Assistant Secretary, Dorothy P. Jackson.

BOOK REVIEW

DICTIONARY OF FOREIGN TRADE, Revised Edition, by Frank Henius, Foreign Trade Counselor; published by Prentice-Hall, Inc. Price $10.00 (special damaged copy price); over 1,000 pages; 6" x 9".

An invaluable reference book on foreign trade, this volume contains concise explanations of foreign trade terms, usages, practices, abbreviations, techniques and procedures. The material is arranged in alphabetical order and covers all aspects of foreign trade including buying, selling, importing, exporting, packing, shipping, banking, invoicing, customs, and insurance. Also included are a compilation of 3,000 abbreviations in English, French, Spanish, and German, and 300 Foreign Trade Forms.

TRAVEL TO JAPAN BY BUSINESSMEN

Relaxed regulations governing travel to Japan by businessmen make it possible to enter Japan for more extended periods than heretofore. All firms (except service firms) which wish to send representatives to Japan should make application to Department of Commerce Field Offices. Procedures for making such application remain the same as those already in effect for businessmen going to Japan to buy or sell goods. Purposes of travel may now include purchase or sale of commodities, investigation of investment possibilities, or seeking restitution of property held in Japan before the war. For the present the same application forms should continue to be used; firms wishing to seek restitution of property should indicate, in connection with their statement of purpose, the nature, location, and extent of such property. New application forms are being prepared and will be distributed in the near future. Service firms will continue to make application to the Department of State.

Marine Insurance

The London Letter

By Our United Kingdom Correspondent

The Insurance Horizon

E. B. Ferguson, general manager of the Phoenix Assurance Company, Ltd., London, recently made a tour of the United States and the British Empire, and reviews the insurance position as follows in a report to the Insurance Institute of London:

One cloud rises from the political philosophy widely entertained today, that insurance is a service to the community, one which, having been brought by free enterprise to its present state of efficiency, can now well be made the subject of State monopoly. I do not imply that the principles upon which insurance has been developed to its present-day immense influence and prestige, are identified with any special political or economic theory. Such principles as the contributions of the many meeting the losses of the few can, from the sociological viewpoint, effectively be carried into operation by the State itself. War Risks, insurance and national insurance schemes making basic provision for unemployment, sickness, and old age, are cases in point.

But we are entitled to claim that where insurance service, in relation to economic activity or to personal and individual needs, is provided by free enterprise it makes a notable contribution to all that we, in the English-speaking world, regard as the privileges enjoyed by free men in a free society. It is, perhaps, excusable for the layman to indulge in rather shallow thinking on this point. We are engaged in a profit-making enterprise, and to many who are on the outside, the making of profits seems an easy matter. He does not see the multitude of transactions and the judgment exercised in each of them that goes to make up the final result. He is in no real position to assess the unresting efforts that are made in the field of risk improvement, nor the unceasing control exercised over expenses. Often it is the manner in which his claim is satisfied that provides the measure by which he judges the suitability of his particular insurer, and possibly by which he may praise or condemn the business as a whole.

We know full well how much more there is in it than this. Insurance is an essential individual service. That service extends word-wide to give its protection and aid at every point.

The idea that it can be laid on from a central source, like gas or electricity or the telephone, and that payment of the required charge will produce a standard cover varying not at all between one individual and another, or one commercial or industrial enterprise and another, ignores this element of personal care, and calls for our unceasing vigilance and refutation at every opportunity open to us.

Mr. Ferguson further stated that the great justification of the British insurance system was that it was sensitive to the new challenges it had to face, and that it had, within itself, the power of adaptation and progress in a changing world. In the United States the insurance industry would develop out of the present strains greater financial strength and increased underwriting skill.

Government Ownership

While the insurance industry in the United Kingdom has received from leaders of the Socialist Government an assurance that there is no intention on the part of the part of the present Government to nationalize insurance, no politician can bind his successor. It is clear, therefore, that one cannot prophesy whether insurance will be allowed to develop on its present lines, or will be politically revolutionized. This was the theme of Major-General Sir Claude F. Liardet, presiding at the annual meeting of the Corporation of Insurance Brokers, held in London.

Would their sons and grandsons buy their insurance and the insurance of their firms at a post office, Sir Claude Liardet asked. That, he maintained, was no idle fantasy, as there were numerous fantatics who thought that that could be achieved with advantage. Insurance brokers must give the fanatics no grounds for demonstrating that they could improve the efficiency of a service which had been operating under private control for many centuries.

British insurance represented security—and that was why such an enormous volume of foreign insurance was effected in the home market. But there was more than that—the cost must be commensurate with the cover, or, more simply, the policy must be good value for the premium. That was not solely the concern of insurers. The brokers formed an integral part of the distributive system, and provided an essential link between producers and consumers.

Today, the insurance broker saw a tendency towards nationalized industries running their own insurance risks or sidetracking the broker when renewing their insurances. The broker had shown his worth in the past. He must consolidate his position, know his job, provide service, and he must be a man of substance. The principal aim of the Corporation was well known, namely, to secure the efficiency of the broker and all that was implied therein.

"There are many influences at work which sooner or later are bound to have an effect one way or another on this great business," Sir Claude continued. "The search-

(Please turn to page 89)

Admiralty Decisions

By HAROLD S. DOBBS *of San Francisco Bar*

Pier Watchmen Claim Entitled to the Benefits of Fair Labor Standards Act

DURING THE LAST FEW YEARS, various groups of employees in varied fields of endeavor, have instituted actions against their employers, both past and present, alleging failure to comply with the Fair Labor Standards Act. Of course, their purpose in bringing such suits is merely to obtain overtime compensation at the rates prescribed by the Fair Labor Standards Act. In most cases, the suits covered claims for a period of as much as four years in the past. It is easy to understand the consternation of the average employer when faced with such a suit, without having had any prior notice of the possibility of such claims. In some of these cases, the judgments in favor of the employee on behalf of a representative group, would or could, bring bankruptcy to the employer named because of his inability to foresee the possibility of such a claim.

In New York very recently, two employees of a pier construction company, instituted actions on their own behalf and also in a representative capacity, for all other employees similarly employed, to recover alleged overtime compensation, liquidated damages and counsel fees under the Fair Labor Standards Act. The action is entitled *Philip Tinyes, et al v. J. Rich Steers, Inc., et al.* Under the penalty provisions of the Fair Labor Standards Act, the employer is liable for the overtime compensation plus an equal amount as liquidated damages, in addition to counsel fees, when it is subsequently found that he has violated the Act. The lower court adjudged that plaintiffs' duties fell within the provisions of the Fair Labor Standards Act and the matter was referred to a referee in order to determine the total sum due the various employees. The case was appealed and it is from that appeal that I make this report.

At the times in question, various plaintiffs were employed by defendant as "steam" and "land" watchmen in connection with the construction of two shipbuilding dry docks, piers and other related work in and about the New York Naval Shipyard at Brooklyn, pursuant to a government "cost-plus" contract. It was admitted that plaintiffs were not engaged in the *production of goods.* Their activities were confined principally to the protection of their employers' undertaking. The "steam" watchmen were required, among other things, to place warning lamps and signals on various work boats used in the project; to watch tie-in lines of boats and to adjust them with the flow and ebb of the tide; and to siphon out dangerous amounts of water which accumulated in such boats. Included among the duties of the "land" watchmen were such tasks as placing warning lamps and signals at various cross streets where the building operation was conducted and on docks, piers, boats and railroad tracks; to control and direct traffic at the crossroads upon the approach of railroad trains within the shipyard proper and at both ends of a suspension bridge when it was elevated to permit boats to pass through; to place lamps and signals upon extension piers; and to guard and adjust mooring lines of concrete barges and divers' scows.

The burden was upon the plaintiffs to establish that they were engaged "in commerce" within the meaning of the Act. *Warren-Bradshaw Drilling Co. vs. Hall,* 317 U. S. 88. The term "commerce", as used therein, is defined to mean "trade, commerce, transportation, transmission, or communication among the several states or from any state to any place outside thereof." 29 U.S.C.A. sec. 203 (b). The test to be applied "is not whether the employee's activities affect or indirectly relate to interstate commerce but whether they are actually in or so closely related to the movement of the commerce as to be a part of it. * * * It is not important whether the employer * * * is engaged in interstate commerce. It is the work of the employee which is decisive." *McLeod vs. Threlkeld,* 319 U. S. 491. Activities which may "remotely affect interstate commerce" are not included within the scope of the phrase "in commerce." *Stoike vs. First National Bank of City of New York,* 290 N. Y. 195, 202.

The court concluded that the plaintffs who are the employees in this case, failed to sustain their burden of proof. While their activities may have indirectly affected commerce in the sense that they tended to lessen the likelihood of interference with river traffic which might possibly result if work boats were to capsize or break free of their moorings, or if they failed to display proper anchor lights between sunset and sunrise, such activities did not bring the "steam" watchmen into the stream of interstate traffic. The evidence failed to show that they were closely or intimately related to such traffic as to be a part of it. The incidental and purely negative effect upon river traffic which might have followed their improper discharge of duties, was not at all related to interstate commerce. The activities of the employees in this case were purely *local* in character and therefore did not come within the provisions of the Fair Labor Standards Act.

The court also found that the same rules and views would be applicable to the "land" watchmen because the streets and bridge over which they controlled traffic were part of the work project, and when the work was completed, they became an integral part of the Navy Yard. Their work did not require them to engage in the repair or maintenance of an instrumentality of interstate commerce.

The lower court's order was reversed and the watchmen's complaints were dismissed.

Sovereign Immunity — The Martin Behrman Case

Under the laws of the United States and other countries as well a sovereign government recognized by the United States, is entitled to immunity from suit upon the request of the ambassador or suitably recognized consul officer. The rule is an outgrowth of the theoretical sovereign and unimpeachable right of a government as such, to make laws and set up rules of conduct for its subjects without giving up any liberties of its own unless it deems it necessary or advisable to do so. I might say that it is a rare thing nowadays to have a plea of sovereign immunity entered in cases pending before the courts of this country and others, because in most cases where a plea of sovereign immunity would be recognized, the government involved considers that from a political and business viewpoint, it is better to recognize a just debt or recognize a just difference of opinion with reference to a claim or debt, and not brush it off by a plea of sovereign immunity.

During the month of November 1947, the plea of sovereign immunity was introduced in a case pending in the United States District Court of New York entitled *Isbrandtsen Company, Inc., as Chartered Owner and Operator of the American Steamship Martin Behrman, and as Bailee of Her Cargo, etc. vs. Netherlands East Indies Government, et al.* After the surrender of Japan in August 1945, and the withdrawal of the Japanese from the Dutch East Indies, an armed movement seeking independence for a "Republic of Indonesia" began, and was opposed by force by the Government of the Netherlands. Early in 1947, libellant Isbrantsen Company, Inc. chartered the American *Martin Behrman*, owned by the United States Maritime Commission on bareboat charter and sailed her with a cargo to Cheribon, a port in Java under control of the "Republic of Indonesia." The cargo having been discharged, the vessel loaded an outward cargo and sought to depart, but was intercepted by a Netherlands warship and conducted to a port under the control of the Government of the Netherlands East Indies, where the cargo was removed from the vessel. The operator of the vessel thereafter filed a libel in the Federal Court of New York, claiming damage for interference of the voyage and the improper removal of the cargo in the sum of over three million dollars. A claim of immunity was thereupon presented to the court by the Attorney General acting upon the request of the Acting Secretary of State.

The request of the Netherlands East Indies was contained in a communication to the Acting Secretary of State, in which the Netherlands Ambassador stated that the Netherlands and the Netherlands East Indies are parts of the Kingdom of the Netherlands, which is a sovereign state and has in no way given its consent to be sued in the manner before the court in any court of law or admiralty in the United States of America either in respect to the Kingdom or any of its constituent parts.

The court felt bound to recognize the suggestion of immunity in accordance with the cases of *Compania Espanola vs. Nevemar,* 303 U. S. 68, and *Mexico vs. Hoffman,* 324 U. S. 30. Respondent's motion for immunity was therefore granted and the motion of the libellant for a default decree was denied.

TUNA CLIPPER SAFETY REQUIREMENTS—(Cont.)

By DAVID W. DICKIE

Editor's Note.—Mr. Dickie has prepared an outline of rule interpretations and the reasons for rule changes which he has encountered in his work with insurance underwriters. The first part of his article, dealing with Safety Requirement Rules 1 to 9, was published in the January Pacific Marine Review.

No. 10 Wing Athwartship Doors

> The wing athwartship doors to the upper engine room on the main deck to be watertight on both wood and steel boats. The sill of the door to be 18″ above the deck.

The house on the main deck in which the galley is located does not extend to the ship's side. The ship's side extends up to the boat deck enclosing a space along side of and aft of the galley. The after end of the enclosed space between the ship's side and the bait boxes is open. On some boats an effort has been made to close the after openings with tonnage doors.

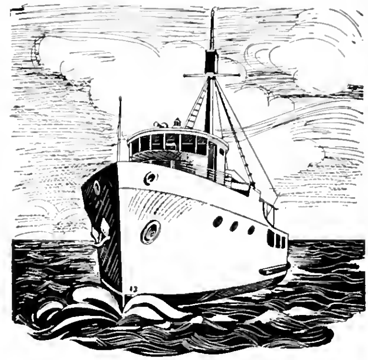
The forward end between the house and the ship's side has been closed with what has been designated a wing athwartship bulkhead, usually bolted in place so machinery can be removed. The doors on each side through the wing athwartship bulkheads have been designated wing athwartship doors.

There is not space at the moment to mention all the various ways the sea gets in, runs along the alleyway and over the sills of the wing athwartship doors. Originally the sills were made 6″ high—raised to 10″— to 12″ and finally to 18″ above the deck in an effort to correct the trouble. It is impractical to make the sill any higher. The doors were made in halves (Dutch Doors) but the fishermen persisted in leaving even the lower half open.

The proper way to make these doors is of steel in one piece with a large port hole—fit the door with three Hydro-Hinges and require that the door be devoid of

(Continued on Page 100)

Coast Commercial Craft



THE STEEL TUNA CLIPPER LUCY ELENA

Under full load conditions, the 111-foot welded steel tuna clipper, Lucy Elena, undergoes her first trial runs in San Diego Bay. The new vessel, built by National Iron Works, is the largest welded steel tuna clipper ever built in San Diego.

The largest steel tuna clipper ever built in San Diego, the 111-foot *Lucy Elena* has just completed her trial runs and was delivered to her owners on January 21 by the National Iron Works, builders of the craft. The new vessel was put through her tests by Machado Medino, port captain at National Iron Works' San Diego plant and a veteran fishing fleet skipper.

The *Lucy Elena* was clocked at 9.8 knots in her speed tests and this speed was made while the ship was operating under full load conditions.

The *Lucy Elena* will fish for the People's Packing Company and was built for John Balestreri, William H. Schmidt, Walter A. Seewald, Julius Cairns, Linwood Champion, George Bullock, Mark W. Crain, Caesar F. Pastore, Francis E. Pastore and A. T. Procopio. Balesrreri will be in command of the new ship.

The *Lucy Elena* is on the raised-deck tuna fishing type, constructed of electric arc welded steel, with a raked beam and a modified tuna vessel stern. The vessel is subdivided with six transverse oil and watertight bulkheads and a transom bulkhead, extending to the main deck, a cofferdam for chain stowage, a forward fuel oil deep tank, a machinery space, and ten brine wells arranged in two rows of five each.

Propeller:

Doran Company 72" x 56", designed especially for the *Lucy Elena* by William Lambie.

Hull:

Shell plating is 5/16" steel plate in the engine room and wherever floors are oil tight. Other floors are ¼" plate. A 5/16" center vertical keel is provided.

In general the vessel is constructed in conformance with the rules laid down by the American Bureau of Shipping.

KORT NOZZLES ON NEW TOW BOATS

TRIAL runs of two newly designed 1000 H.P. towboats, the *Wm. Pitt* and the *Freedom*, have demonstrated they have 30 per cent more "push power" than some other craft in the same type of service, and although the hulls are smaller the additional "push power" is obtained through the use of lightweight, high-speed geared Diesel engines, improved Kort nozzle efficiency and relatively greater draft than riverboats operated under similar conditions.

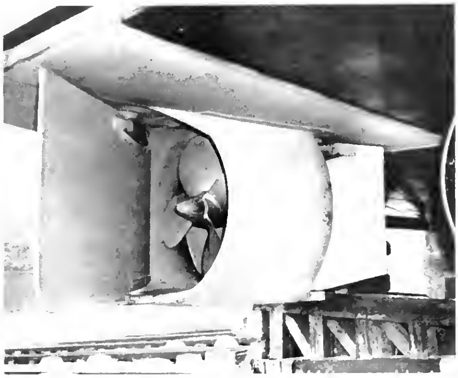
Both vessels now are in service with Dravo Corporation's Keystone Division, towing sand, gravel and coal in the Pittsburgh area. The *Freedom* was launched June 19, and the *Wm. Pitt*, July 17.

Tests with the firm's dynamometer barge showed both craft have "push power" of 34,000 pounds against the dock and 25,000 pounds at a towing speed of five miles per hour. Maximum towing efficiency, the designers explained, is dependent upon "push power" rather than the amount of shaft horsepower that can be developed.

Effective thrust of the vessels is increased because the new hull design eliminates the necessity of stern tunnels which provides additional Kort nozzle area. The shape of the hull allows increased and freer flow of water to the Kort nozzles, especially in shallow water. Kort nozzles surround each propeller and control the direction and velocity of water passing to, through and away from it.

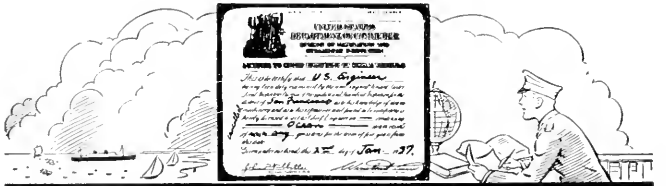
Each vessel is 116 ft. long with a 27 ft. beam and 10 ft. moulded depth. Draft, with 3/4 fuel and supplies, is 7 ft.

Power for each towboat is supplied by two General Motors supercharged, 6-cylinder, 2-cycle Diesel engines that are controlled from the pilothouse. Both engines run continuously in the same direction and drive high-tensile, manganese bronze, four-bladed propellers designed to absorb 500 H. P. each at 700 R.P.M.



Kort nozzles surround the propellers. New hull shape eliminates necessity of stern tunnels providing increased Kort nozzle area.

The Wm. Pitt, and a sistership, the Freedom, recently demonstrated 30 per cent more "push power" than other vessels in this service. The new 1000 horsepower boats were designed and built by Dravo's Engineering Works Division. Improved hull design and other innovations are responsible for the increased "push power" that results in maximum towing efficiency.

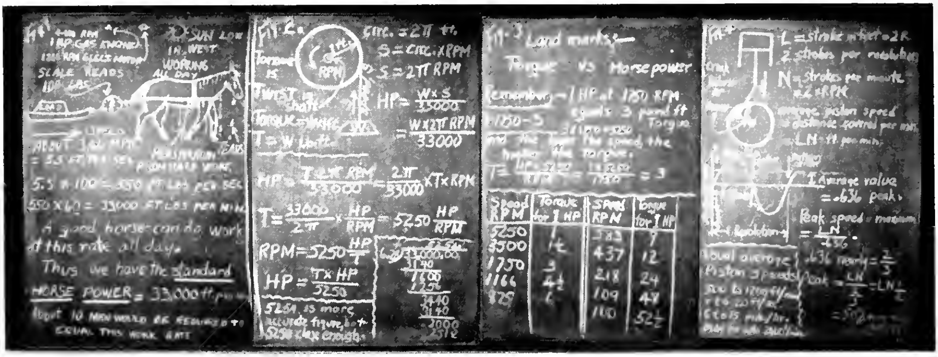


Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

"CHALK TALKS" ON APPLIED MATHEMATICS



Blackboard figures 1 to 4 mentioned in the text.

THE HORSE POWER

There are two things that the juniors and even perhaps the unlicensed men aboard the ship know about the horsepower. One, that it is 33,000 foot pounds per minute and, two, that the power of an engine is PLAN/33,000. We propose to show how these are arrived at mathematically.

Fig. 1 shows a one horsepower gasoline engine at about 4000 rpm, an electric motor at one horsepower 1800 rpm, and a horse, all drawn to about the same scale. This contrast should cause some questions and perhaps doubts. It is clear only when we realize that the horsepower is a compound unit (made up of several factors) and is a rate of transfer or a time rate unit. It is a rate of conversion of energy, i.e., foot pounds per minute, just like speed is a time rate of covering distance.

Also shown is the conversion to seconds by dividing by 60. The interesting thing about this sketch is the poor horse. He has been dragging this load all day as indicated by the setting sun. He is covered with perspiration and tears are running from his eyes. It has been all he could do. Although the holdback load is only 100 pounds it has tired him out. He could easily pull 6 or 8 times this drag for a short haul but 100 pounds is all he could pull as an all day haul. This illustrates accurately the origin of the unit of power. In the days of James Watt who did so much toward the development of the steam engine, the horse was the emblem of strength and power, and why not rate an engine in terms of what a

horse could do? So they tried out an average horse as shown in the sketch and arrived at the engineering conclusion that he could drag a load which required 100 pounds to pull all day and at a speed of 5.5 feet per second. This gave the now standard figure of 550 foot pounds per second.

Note that the foot pound is a unit of energy or work done, being that of overcoming a force of one pound through a distance of one foot. The horse overcame 100 pounds through 5.5 feet every second of time. Do not confuse the pound foot with the foot pound. See Fig. 2. Torque or twist of anything is measured in pound feet. The twisting effect that an engine applies to a shaft and also the counter-twist presented by the load are both measured in *Torque* of which the unit is the pound foot.

As indicated in the figure a shaft or drum winding up a rope will pull up the rope at a rate of speed determined by the rpm of the shaft. A weight or load on the rope will apply a resistance to being pulled up and thus the speed of the rope and the weight in pounds will give the horsepower of the system and also the relation between torque times rpm and speed times weight. This relation is developed in Fig. 2.

The "land-mark" or figure to be remembered is the 3 which is the torque for one horsepower at 1750 rpm. This is indicated in Fig. 3 where also is given a list of several values of the torque and corresponding rpm, all representing one horsepower. From this we may know that the tail shaft of our ship turning at 100 rpm and delivering 6000 HP has on it a torque of $52\frac{1}{2}$ times 6000 or 315,000 pound-feet of torque which is 315,000 pounds applied at one foot from the center. If the "bull" gear of the gear reducer is 10 feet in diameter or 5 foot radius we have 315,000/5 equals 63,000 pounds of force applied to the gear teeth of this gear.

Thus we have two formulas for HP. One for a force moving along a line and the other for a torque which is also turning. Note that the force or torque is not power without the motion or rotation. A force of a thousand pounds screwed up in a vise is not power. In fact, if it were not for the friction in the worm of the vise and a little yield or spring effect in the vise frame it would not require any energy or work to set it up to 1000 pounds although it would require a force. Force is not power or work, and speed is not power or work but the product of the two is. This is the dual nature of power.

Applying this to engines we note at once that an engine capable of delivering a certain torque can have any horsepower rating we may care to give it from one or less to many thousands, all depending on the speed we care to run it. When this fact fully impresses our mind we at once wonder why we do not have engines with more power and less weight. This is exactly the question that caused DeLaval, Parsons and Curtis at the turn of the century to try for more speed using their steam turbines. In fact they had a form of engine then that could run at such a tremendous speed of 500 rpm that no one had a load capable of being driven at that speed. Large capacity high speed gears were unknown then. Therefore it is speed limitations that limit horsepower. There are several of these limits. One is the load, but modern gears permit almost any engine speed to be geared down to any load. For instance, turbines in regular use are running at over 10,000 rpm. Gas turbines may run up to 20,000 rpm. But the more serious limit is that of the weight of reciprocating parts of the steam and diesel engine. And if this limit is partly overcome by light weight metals and balance, then we have the more serious limit of the speed of the sliding action of the piston and rings on the cylinder walls. There seems to be no suitable solution of this limit usually referred to as piston speed. Even if we could take care of the lubrication we would find that the valves would have to be too large and would be mechanically difficult. Note that increased piston speed means increased steam flow because of increased HP. This means larger steam lines as well as valves. Of course if we sacrifice economy and efficiency we can increase piston speeds for more HP.

Fig. 4 shows relation between revolutions per minute (rpm) and piston speed. If L is the length of the stroke in feet and N is the number of strokes per minute the AVERAGE piston speed is LN but the peak is about 3/2 LN. While as shown the typical speeds are 20 feet per second, some special engines with special valves have run at much more than this. The piston speed of diesel engines is also limited because of lubrication and temperature so that 20 feet per second is high.

Here then is the basic reason why reciprocating engines will always be limited in capacity or, what amounts to the same thing, to weight per HP. Even the reciprocating gasoline engine for aircraft at as high as 2000 rpm will not exceed a piston speed of 20 to 25 feet per second.

The weight of reciprocating parts is also a limit. First it is impossible to balance out the reciprocating forces in all directions. To exactly balance the piston, rod and connecting link with all its parts such as crank bearing, slipper, and so on in the direction of the piston stroke we leave large uncompensated forces in a direction at right angles to the shaft and stroke due to the balance weights we added. We therefore compromise on balance weight. The drivers of a large modern steam locomotive may easily leave the rails at each revolution due to the weight of the balance weights on the wheel, at some high speed. At usual speeds these forces pound the rails, sometimes breaking them, and shake the ground noticeably.

Our next article will discuss the HP formula and the solution of a typical problem.

Maritime Commission Moves in S. F.

Effective Monday, February 16, 1948, the Pacific Coast District Offices of the United States Maritime Commission, presently located at 220 Bush Street and 65 Sutter Street, in San Francisco, will be quartered on the eighth floor at 180 New Montgomery Street, San Francisco.

All correspondence customarily addressed to 220 Bush Street and 65 Sutter Street should, on and after February 16, 1948, be addressed to the Commission at: 180 New Montgomery Street, San Francisco 5, California.

The telephone number at the new location will be changed to GArfield 1-0125.

A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

THE EARTH'S MAGNETISM AND ITS EFFECT ON THE SHIP AND COMPASS

(Continued)

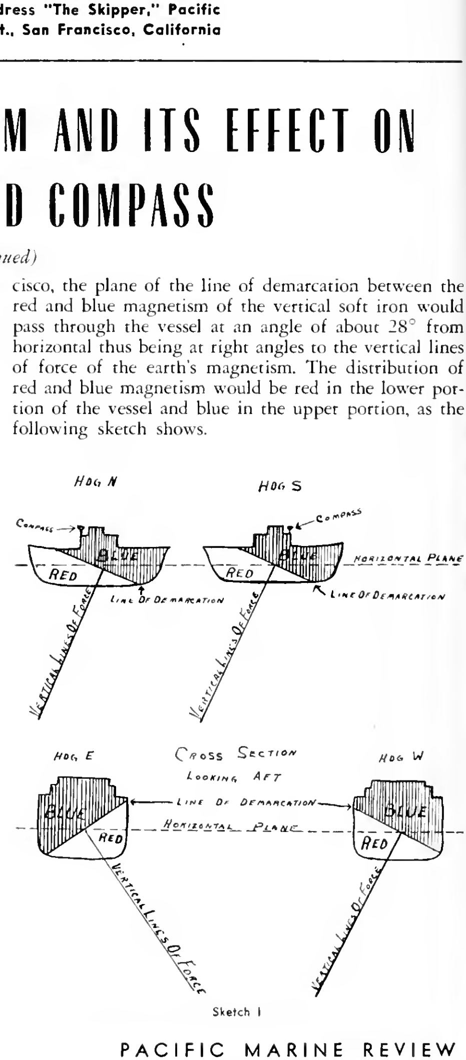
Due to limited space it was impossible in the last issue to complete our discussion of the effect of the Earth's Magnetism on the ship and compass; so, let us continue by taking up:

Transient Magnetism

The term transient magnetism does not relate to a particular type of the earth's magnetism which is changing its direction of flow constantly but rather is a peculiar type of magnetism which is found in soft iron only. This brings up the question—what is soft iron? Soft iron, as we think of it in our study of magnetism, is iron or steel which has the ability to become magnetized instantly when placed in a magnetic field and to instantly lose this magnetism when removed from the magnetic field thus allowing the line of demarcation and the distribution of red and blue magnetism to change as the direction of the mass changes in relation to the lines of force.

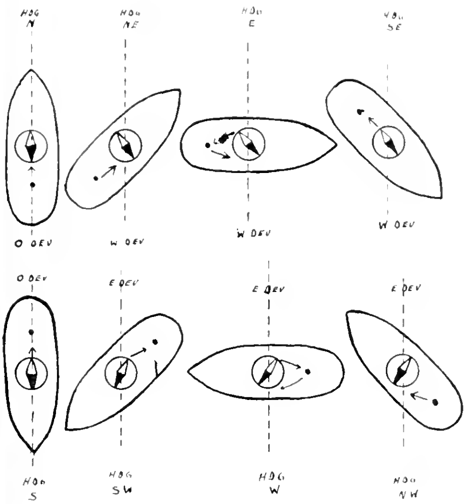
Semi Circular Deviation Due to Transient Magnetism

The remaining part of semicircular deviation which was not discussed in the last issue is due to the Transient Magnetism in the vertical soft iron of the vessel. This is caused by the unequal distribution of vertical soft iron forward and aft of the compass. Usually we have a greater mass of vertical iron aft of the compass and at a height which is nearer the height of the compass such as stacks, bulkheads of the superstructure, etc. This being true and remembering that vertical iron is affected only by the vertical component of the earth's total force we can picture mentally how the line of demarcation and distribution of red and blue magnetism would be dependent on the magnetic latitude of the vessel at that particular instant. If we picture in our minds a vessel in North Magnetic Latitudes, for example, near San Francisco, the plane of the line of demarcation between the red and blue magnetism of the vertical soft iron would pass through the vessel at an angle of about 28° from horizontal thus being at right angles to the vertical lines of force of the earth's magnetism. The distribution of red and blue magnetism would be red in the lower portion of the vessel and blue in the upper portion, as the following sketch shows.



Sketch 1

From these sketches we can easily see that the vertical iron which is nearest the compass and because of its nearness has the greatest effect on the compass is aft of the compass and has blue magnetism when in North Magnetic latitudes. The reverse is, of course, true on vessels in South Magnetic latitudes. Since the vertical soft iron is usually evenly distributed on either side of the center line of the vessel, the poles of the red and blue transient magnetism of the vertical soft iron is usually assumed to be on the centerline of the vessel. By the following sketches it will be quite easy to see how a blue magnetic pole aft of the compass would cause semi-circular deviation.



Sketch 2

1. Dasbed lines represent Magnetic Meridians.
2. Black dot aft of compass represents blue pole of transient magnetism in vertical soft iron.
3. White end of compass needle represents red end of compass card.
4. Arrows represent attraction or repulsion of magnetic lines of force.

To compensate for this semi-circular deviation which is caused by a greater amount of soft iron aft of the compass than forward of it, we simply place a smaller mass of soft iron in a vertical position forward of the compass and nearer to it. This mass is called the *Flinders Bar.* It is isolated from contact with any other magnetic material by means of a brass case and when induced with magnetism it also has a line of demarcation and a distribution of red and blue magnetism with the blue magnetism in the upper end and nearest to the compass card, thus counteracting the effect of the blue magnetism aft of the compass. The reason this smaller mass is able to counteract for the larger mass aft is, as we mentioned previously, the magnetic force varies inversely with the square of the distance and since the smaller mass is much nearer the card than the larger mass, the magnetic force exerted on the card is the same.

To finish our discussion of the causes of semi-circular deviation let us sum them up briefly.

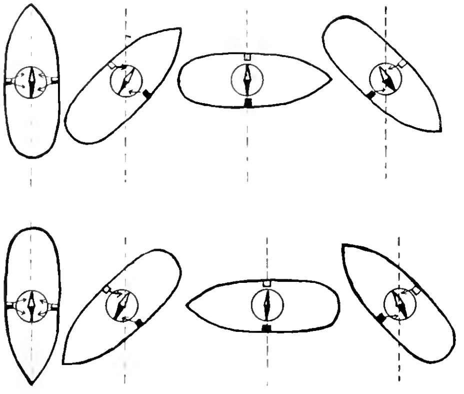
1. First and chief cause is the horizontal component of the sub-permanent magnetism of the ship.— Compensated for. By the small permanent compensating magnets.
2. Second: It is caused by the vertical component of the sub-permanent magnetism of the ship.—Compensated for: By the small permanent compensating magnets.
3. Third and last cause is the transient magnetism in the vertical soft iron of the vessel.—Compensated for: By the Flinders Bar.

Now to take up the cause of Quadrantal Deviation.

Horizontal Soft Iron and Quadrantal Deviation

Transient magnetism affects horizontal soft iron just as it does vertical soft iron and the line of demarcation and the resultant distribution of magnetism changes as the heading of the vessel changes. In our consideration of this transient magnetism which is induced in the horizontal soft iron, however, we have to consider the fore and aft and athwartship components separately. That is to consider the horizontal soft iron which is forward and aft of the compass as having two poles and that which is athwartships of the compass as having two poles. With this consideration we can see that the fore and aft component would cause a westerly deviation on a North East heading in North Latitude. We can also see how the athwartship component would cause easterly deviation on a North East heading in North Latitudes. Due to the shape of our vessel we have more horizontal soft iron forward and aft of the compass than athwartships and it would seem that the fore and aft component would cause the greatest amount of deviation so that we would have a remainder of westerly deviation on a North East heading. This is not true though, because the poles of the fore and aft component are farther away from the compass and magnetic force varies inversely with the square of the distance. So, we have our greatest force in the athwartship component and as a result have only to consider this force in our compensation for Quadrantal deviation. Knowing this, we see that this athwartship pole of red magnetism on the port side of the vessel in North Latitude would repel the north end of the compass card to the Eastward. As the ship swings around to East, the athwartship poles come in line with the magnetic meridians and the North, South axis of the compass card thus causing no deviation. Then as she swings to the South East, the athwartship pole of red magnetism is to be Eastward of the compass needle, thus repelling it to the westward causing westerly deviation. Swinging the ship to a south heading, we see the athwartship poles at right angles to the north south axis of the card; thus one pole cancels out the effect of the other and no deviation is caused, and so on around

the compass card as is shown in the following sketch.



Sketch 3

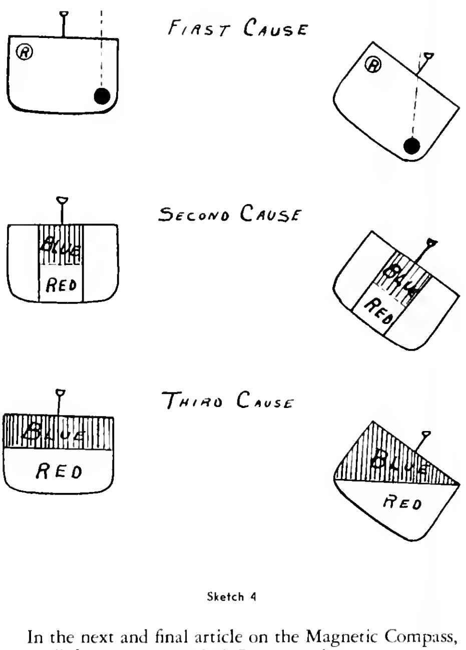
Quadrantal deviation due to the athwartship component of the horizontal soft iron of the vessel.

1. Dashed lines represent magnetic meridians.
2. Black ends of compass needle represent blue magnetism.
3. Black poles of horizontal soft iron represent blue magnetism.
4. Arrows represent magnetic lines of force.

Compensation for this Quadrantal deviation in horizontal soft iron is accomplished by means of quadrantal spheres. These spheres are mounted athwartships of the compass card and are not connected with any magnetic material so that they too become induced with magnetism from the horizontal lines of force of the earth's magnetism thus becoming independent magnets. The line of demarcation passes through the center of these spheres in an East West direction with half of the sphere having red magnetism and half having blue magnetism. Always that half which is nearest the North has the red magnetism. Since the athwartship component of the magnetism in the horizontal soft iron of the ship is induced by the same lines of force that affect the Quadrantal spheres, the north half of the athwartships horizontal soft iron will also have red magnetism which causes deviation. But, since we have the Quandrantal spheres mounted athwartships, the side which has blue magnetism would be nearest the compass to compensate for the deviation caused by the red magnetism of the horizontal soft iron of the ship—the reverse being true with the same compensating effect on the opposite side of the ship.

Heeling Error causes us little difficulty with present day steam vessels because when a vessel rolls or heels to one side causing deviation to the East, she usually rolls almost as far to the opposite side thus causing westerly deviation or counteracting for the Easterly deviation. This was, of course, not true in the days of sailing vessels when a ship might be heeled over to the same side for days thus causing a deviation that had to be reckoned with in order to make good the desired course. However, it will cause the compass card to have an undesirable characteristic of swinging constantly from one side to the other as the vessel rolls and surely should be corrected for. This error is always greatest on North or South headings.

Heeling error is caused by three forces. *First* by the sub-permanent magnetism of the vessel in that it changes the position of the poles of the sub-permanent magnetism of the ship in relation to the center line of the ship thus causing a change in the deviation caused by these poles. *Second* cause is the Transient magnetism in the vertical soft iron of the vessel. This magnetism causes no deviation on a North or South heading as before stated when the vessel is on an even keel; however, if we list the vessel to starboard on a North heading in North Latitude we can see that the pole of blue magnetism would shift to port thus deflecting the compass needle and causing deviation. *Third* cause is Transient magnetism in soft iron which is horizontal when the vessel is on an even keel but takes on vertical characteristics when heeled. Again on a North heading in North Latitude we see that if we list the vessel to starboard and this horizontal soft iron becomes induced with magnetism from the vertical component of the earth's total force she will have a blue pole on the port side thus causing deviation when heeled, as is illustrated in the following sketch.



Sketch 4

In the next and final article on the Magnetic Compass, we will discuss the Practical Compensation.

Running Lights

Albert

W

Gatov

•

President
Pacific
American
Steamship
Association

(See Page 72)

PACIFIC AMERICAN STEAMSHIP ASSOCIATION ELECTS

(Details on Page 73)

Among the newly elected or continuing officers of the Pacific American Steamship Assn. are Albert W Gatov, president, whose photo appears on page 71, John E. Cushing of Matson Navigation Co., George A. Pope, Jr. of Pope & Talbot, Henrietta T. Smith, secretary, and David N Lillevand of Grace Lines. (Above and right.)

Also, below, left t right: Maitland S. Pen nington of Pacific Tran port Lines, A. R. Lintn of American Mail Lin E. Russell Lutz of Ame ican President Lin and W. T. Sexton Coastwise Line.

PACIFIC AMERICAN STEAMSHIP ASSOCIATION ELECTS

Albert W. Gatov, for the past two years executive director of the Pacific American Steamship Association, was elected president of the group at its annual meeting in San Francisco recently. He succeeds E. Russell Lutz, executive Vice President of American President Lines.

A. R. Lintner, President of the American Mail Line, was re-elected as PASSA Vice President for the Seattle-Puget Sound Area. Hillman Lueddemann, Pope and Talbot Vice President and Portland Chamber of Commerce President, was re-elected as Vice President of the steamship group for the Columbia River Area. Matson Navigation Company's Vice President Ralph J. Chandler was elected again as Vice President in the Los Angeles-Long Beach Area.

New Vice Presidents in San Francisco elected at the meeting are D. N. Lillevand, Grace Line Vice President and Maitland S. Pennington, Vice President of the Pacific Transport Lines. Henrietta T. Smith, San Francisco, was re-elected Secretary-Treasurer.

John E. Cushing, S. P. Fleming, A. R. Lintner, E. Russell Lutz, T. G. Plant, George A. Pope, Jr., and W. T. Sexton were elected to the Advisory Board.

Gatov has been in shipping for over twenty years, starting with the Pacific Steamship Company in Los Angeles in 1927. He was an Army Major in World War II, serving at Fort Mason in San Francisco and overseas in the Persian Gulf Command. Before going with PASSA, he served for a time with the War Shipping Administration in San Francisco.

The Pacific American Steamship Association comprises the sixteen major American flag steamship companies operating on the Pacific Coast.

S. F. PROPELLER CLUB

Left to right, top: Speaker of the day, Maitland Pennington; new vice-president and presiding for the day, Ed Harms; lame duck but helping to row the boat, Joe Geary. Lower: Port manager general Robert Wylie and retiring president Miller Laughton.

Pictures taken at the head table during the January meeting of the San Francisco Propeller Club during which Maitland Pennington spoke eloquently in favor of cooperation in immediate solving of all problems affecting the movement of cargo through Pacific Coast ports. His efforts have aroused the industry to action.

SAFETY RECORD ON CLEVELAND

An indication of the remarkable safety record attained by Bethlehem-Alameda Shipyard, Inc., in building the *President Cleveland* is seen in the fact that during the month of June, 1947, no disabling accidents were experienced and the months of October and November ran consecutively with the same result.

Although shipbuilding is classed as one of the more hazardous occupations in industry, and thousands of man hours exposure were worked in building the *Cleveland*, Bethlehem-Alameda's frequency rate for the year ending November 30, 1947, was only 5.14. This means that there were only 5.14 disabling injuries per million hours worked.

GOOD NEIGHBORS GO A-VISITING

Left to right: Emmet J. McCormack, Vice-pres. & Treas., Moore-McCormack Lines, N. Y., and Eugene F. Moran, Pres., Moran Towing Co., N. Y., before they sailed for Buenos Aires aboard Moore-McCormack Lines' Argentina on her first postwar voyage from New York to the East Coast of South America. The liner sailed from Pier 32, North River, at 5 p. m. January 15, 1948.

George W. Codrington, general manager of Cleveland Diesel Engine Division, General Motors Corporation; and James S. Hines, publisher of Pacific Marine Review, at the Press Luncheon held January 8 at the Hotel Biltmore, New York City

THE MOTOR BOAT SHOW

The New York Motor Boat Show, January 9 to 17, drew a tremendous attendance, and its success was a great tribute to George W. Codrington of the Cleveland Diesel Engine Division of General Motors. He has been president of the Show for the last two years.

The picture herewith suggests the country-wide nature of the motor boat industry. George Codrington is from Florida while his office is in Cleveland. Jim Hines is from Georgia while his office is in San Francisco. They meet at this greatest evidence of interest in boating in the New York Show.

MARINE DISTRIBUTORS ATTEND CONFERENCE

The Marine Distributors of Series 71 GM Diesel engines from the United States and Canada attended a two-day sales conference in the Biltmore Hotel, New York City, on January 8 and 9. This annual meeting sponsored by Detroit Diesel Engine Division of General Motors and conducted by W. C. Gould, Detroit Diesel marine salesmanager, preceded the opening of the National Motorboat Show in which Detroit Diesel had a large exhibit of marine engines.

Among the distributors attending this meeting were executives from W. H. Moreton Corporation, Boston, Mass., Diesel Marine & Equipment, New York, N. Y., Johnson & Towers, Philadelphia, Pa., and Baltimore, Md., Paxton Company, Norfolk, Va., Morgans Inc., Savannah, Ga., Florida Diesel Sales, Jacksonville, Fla., Kennedy Marine Engine Company, Biloxi, Miss., George Engine Company, New Orleans, La., Stewart & Stevenson, Houston, Tex., Crofton Diesel Engine Company, San Pedro, Calif., West Coast Engine Company, Oakland, Calif., Gunderson Bros. Engineering Company, Portland, Ore., Industrial Marine & Equipment Company, Rochester, N. Y., Western Machinery Company, St. Louis, Mo.

There were many present from Detroit Diesel Engine Division including W. T. Crowe, General Manager and V. C. Genn, General Salesmanager.

Forster Shipbuilding Company Begins Operations

"From Rowboats to Battleships" is the slogan of the Forster Shipbuilding Company which has just been incorporated out of the facilities and properties of the Garbutt and Walsh Shipyard, Terminal Island, Calif.

The new company is comprised of Thomas B. Forster, president, James J. Buntin, secretary-treasurer, David Walsh, yard superintendent, and E. A. (Bill) Wilson, outside superintendent. All have had several years experience in the marine field, Forster 33 years, Buntin 31 years, Walsh 25 years, and Wilson 35 years. Forster and Buntin were associated with Bethlehem Steel Company's Shipyard Division in San Pedro, Forster as head of the yard there. Walsh has been with Garbutt and Walsh for approximately twenty years. With their well-rounded experience the company members are able to handle all types of diesel engine and hull repairs.

The shipyard, located at the foot of Ferry Street in Terminal Island, includes a well equipped machine shop, electrical shop, blacksmith shop, welding shop, store rooms and a boat building shop. It has twelve operating marine ways with lifting capacity of 200 tons and repair wharves with 25 ton lift derrick.

During World War II the Garbutt and Walsh Shipyard constructed plane personnel craft and barges for the war effort. They have just completed a 45-foot sailing sloop.

In addition to present yard operation, the new management intends to carry on waterfront repairs, which will be taken over by Wilson, who is well known in marine repair circles.

Wheeler Manufacturing Company Moves

Announcement has been made by Thomas S. Ryan of the C. H. Wheeler Manufacturing Company of Philadelphia that their San Francisco office has moved from the Rialto Building, 116 New Montgomery St., to Suite 304-5 on 16 California St.

Left to right: James J. Buntin, E. A. (Bill) Wilson, Thomas B. Forster, and David Walsh, all of Forster Shipbuilding Co.

Gage Lund Elected to Board of Standard Oil of California

Election of Gage Lund to the board of directors of the Standard Oil Company of California was announced following a recent meeting of the board.

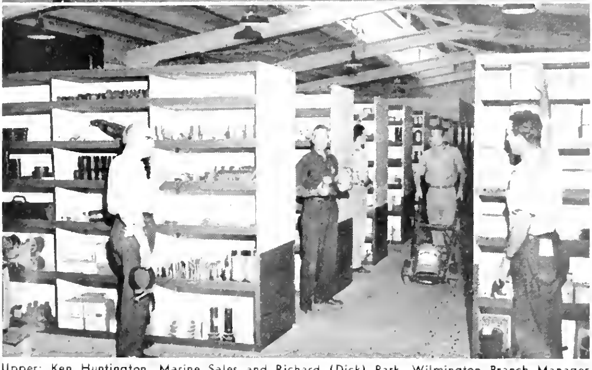
Widely known in the oil industry, Lund has been chairman of the board of The California Company and the Standard Oil Company of Texas, both wholly-owned subsidiaries of Standard of California.

A native of Iowa, Lund studied at Montana State College and Stanford University, graduating from Stanford in 1924. He joined Standard the following year and worked as a geologist and drilling foreman in the Rockies and Texas for the next eleven years until he became division superintendent of The California Company's Gulf Coast division, with offices in Houston.

In 1938 he was made assistant manager of all operations of The California Company and Standard of Texas, and three years later was elected president of The California Company. He is a member of the Society of Automotive Engineers, the American Association of Petroleum Geologists, and the American Petroleum Institute.

Gage Lund

REPUBLIC SUPPLY GROWS ON



Upper: Ken Huntington, Marine Sales and Richard (Dick) Park, Wilmington Branch Manager, Republic Supply Co. Center, left to right: Bill Dumble, Ken Huntington, Larry L. Yocky, Warren Vincenti, Jack Hayes, Dick Michael, L. E. Cooper, and Jim Nesmith. Lower. Part of the warehouse.

THAT THE action of Republic Supply Company in opening a new branch in Wilmington, California, has served a useful purpose in the marine, petroleum and industrial fields in the Los Angeles-Long Beach area is indicated by the growing activity in and about the warehouse.

Now readily available to the marine trade is a well selected stock of such lines as Lunkenheimer valves, Stockmen valves and fittings, Tube Turns welded fittings, Watson-Stillman forged fittings, Great Western cordage, Raybestos-Manhattan Rubber hose and belting, Plomb, Standard, Starrett, and Black and Decker tools, Broderick and Bascom wire rope and slings, Boston and Lockport blocks, and a large assortment of miscellaneous supplies.

Merrill Advances At National Lead

Lloyd W. Merrill has been appointed Assistant Sales Manager for the Central Division of the Pacific Coast Branch of the National Lead Company effective January 1, 1948 according to an announcement made by James L. Caruth, Pacific Coast Manager for the company.

Merrill started with the company in 1940 as a sales representative in San Francisco and was transferred in 1942 to the San Joaquin Valley territory. He returns from that territory to take up his duties in San Francisco. He served for two and one-half years in the Navy during World War II.

Quiz Questions

Where is it possible to go from coast to coast—from the Atlantic to the Pacific—for only $2.40?

Yep, you're right. Panama!

On the Panama Railroad ,which is owned by your own United States of America, you make this transcontinental trip for the small sum of only two dollars and forty cents. The line itself is only 47 miles in length, but it extends from the City of Panama to Colon. Of course, it takes a slight additional sum to get from wherever you happen to be to Panama City!

At that, when the line was opened in 1855, it cost quite a bit more to travel on it than it does now. Yes indeedy! To discourage travel, so they said, they charged 50 cents a mile and 5 cents a pound for baggage!

De Laval Changes and Promotions

Major executive promotions and organizational changes affecting sales, production and engineering divisions have been announced by the De Laval Steam Turbine Company, Trenton, New Jersey.

Under the reorganization a five member executive committee has been created consisting of H. L. Watson, president, serving as chairman; George C. Stoddard, chairman of the board; Henry W. Johnson, vice president; C. Richard Waller, vice president, and George W. Smith, Jr., assistant to the president.

In executive promotions, J. P. Stewart has been appointed manager of the newly combined commercial and marine sales divisions succeeding H. V. Petersen, who has retired after thirty-four years' service. H. G. Bauer, manager of the marine division, has been appointed executive engineer of the company. J. W. Hertzler, manager of worm gear sales since 1924, has retired and is succeeded by W. A. Reynolds, who becomes manager of the combined IMO rotary pump and worm gear divisions. C. A. Jurgensen has been appointed acting works manager. Appointment of W. A. Neumann, Jr., as factory controller, assistant treasurer and assistant secretary was announced previously.

Earlier this year Messrs. Waller, Bauer and Reynolds were commended by the Bureau of Ships, Navy Department, for outstanding contributions to the successful prosecution of the recent war.

Mr. Stewart came with De Laval in 1946 to handle the sales of its centrifugal compressors after seventeen years capital goods experience with the Elliott Company, Jeanette, Pennsylvania and Borg-Warner Corporation, Milwaukee, Wisconsin, where he held engineering, production, sales and executive positions.

Mr. Bauer joined the De Laval organization in 1937 after extensive marine engineering and shipbuilding experience in Europe and in this country. He has concentrated on marine activities and for the past two years has been manager of the marine division.

Top, left to right: H. G. Bauer and W. A. Reynolds. Left, J. P. Stewart

Mr. Reynolds became associated with De Laval in 1932 when he was made manager of the IMO pump division, which he still retains as part of his new position. Previously he was assistant to the vice president and general manager of the Hendey Machine Company, Torrington, Connecticut, and sales engineer for the Dravo Corporation, Cleveland.

For the past sixteen years Mr. Jurgensen has served in all phases of the company's production operations, and until his new appointment he was manager of manufacturing methods and standards. During his many years with De Laval, Mr. Jurgensen has introduced and developed many advanced metal cutting and manufacturing processes particularly adaptable to turbine, gear and pump manufacture.

Pedley-Knowles Takes on U S Rubber Line

Eric Pedley, president of Pedley, Knowles & Company, San Francisco ship chandlers, announces that his company has been appointed distributor for the complete line of mechanical rubber goods manufactured by the United States Rubber Company. This includes U. S. hose, packing and belting, expansion joints, electrical wire and cable, mountings, flooring mats and matting.

"The addition of the U. S. mechanical rubber merchandise enlarges our line of marine merchandise carried in stock," says Pedley, "which includes Pittsburgh Plate Glass Company Marine Finishes, Bethlehem Wire Rope, Whitlock Cordage, Boston and Lockport Blocks, Condenser Service & Engineering Company's products, as well as other deck, engine room and steward supplies."

Pedley-Knowles' office and warehouse are at 134 Sacramento St., San Francisco.

M. J. Buckley

M. J. Buckley Appointed Senior Vice President of APL

Appointment of M. J. Buckley as senior vice president in charge of planning and development for American President Lines, Ltd. has just been announced by George Killion, president of the company.

Buckley has devoted his business career to the Maritime Industry and development of the American Merchant Marine. For fifteen years he was associated with the Pacific Mail Steamship Company, and in 1917 was appointed president of Ocean Steamship Agencies, Inc. In 1921 he became assistant manager and manager of operations for the United States Shipping Board, Washington, D. C. He was associated with the Dollar Steamship Lines for sixteen years as freight traffic manager and later as vice president in charge of freight traffic. In 1938 he was appointed vice president in charge of freight traffic for American President Lines and also served as a member of the board of directors and a member of the executive committee of the company.

During the course of his career Buckley has traveled extensively to the Far Eastern markets served by his Company, and has been in demand as a public speaker and spokesman for the industry in this country and abroad. He served as industry adviser to the State Department at the meeting of the United Maritime Consultative Council in Amsterdam in June 1946 in connection with the over-all problems of all the maritime nations.

Buckley has contributed many widely-read articles on shipping and foreign commerce to newspapers and technical publications and has taken an active part as panel leader and speaker in the annual meetings of the American Merchant Marine Conference, the Propeller Club of the United States, the National Foreign Trade Council, and various Pacific Coast domestic and foreign commerce groups. He has been active in the formation and development of traffic conferences, pools and related organizations in various parts of the world, and is generally recognized as one of the best informed shipping experts in domestic and foreign trade.

G. Stewart Brown Appointed By Standard Oil of California

G. Stewart Brown

Appointment of G. Stewart Brown, former State Department official, as manager of the public relations department of the Standard Oil Company of California, was recently announced by the company at San Francisco.

Brown was a United Press correspondent in Europe for ten years, serving in London, Paris, Geneva, Rome and Vienna. In 1939 he was appointed director of public information for the American Red Cross in Washington, later serving as vice chairman in charge of national public relations and fund raising for the Red Cross. The War Department appointed him director of public relations of the Allied Commission in Italy in 1945, and he headed the United States Information Service in Italy when the Commission disbanded.

Prior to his appointment with Standard, he was deputy director of the Office of Information and Educational Exchange in Washington. He is a graduate of the University of Arizona.

Daniel D. Strohmeier

Strohmeier Heads Bethlehem Shipbuilding

Daniel D. Strohmeier has been appointed to succeed the late W. H. Collins as vice president in charge of Bethlehem Steel's shipbuilding division.

Assistant to the vice president since 1942, Mr. Strohmeier's entire business career has been with the shipbuilding division of Bethlehem.

He was on the executive staff of the shipbuilding division during Bethlehem's wartime building program and a representative of the shipbuilding industry on the Government's wartime Shipbuilding Labor Stabilization Committee. He also served as a representative of the industry on the Shipbuilding Commission of the War Labor Board.

On the Ways

New Construction — Reconditioning — Repairs

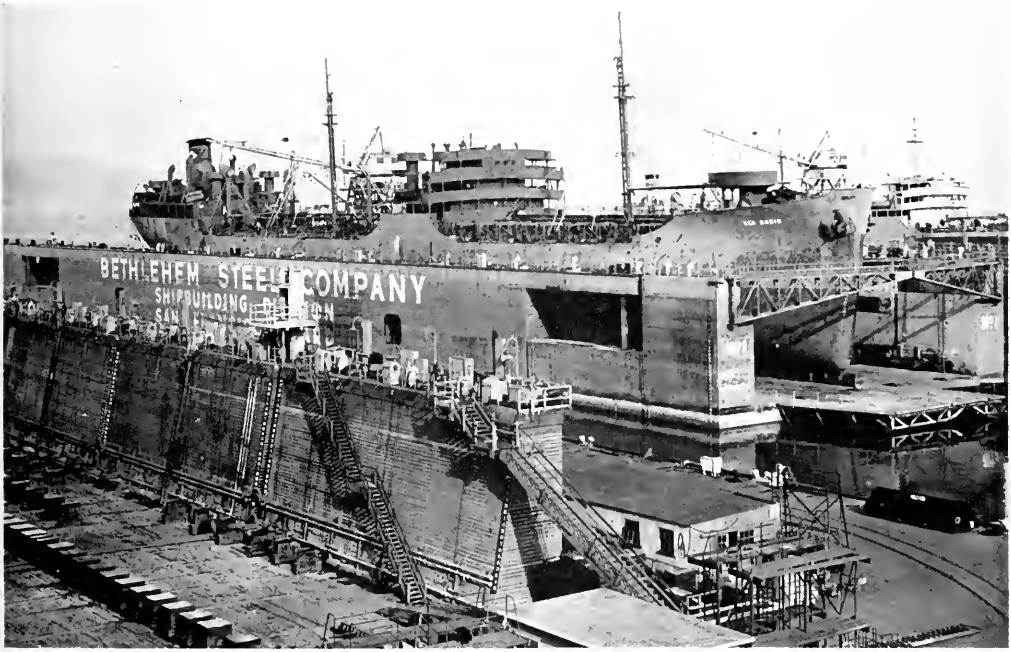
LARGEST STRAPPING JOB ON THE COAST

The largest "crack arrestor" or "strapping" job on the Pacific Coast has just been completed at Bethlehem's San Francisco Yard. This job, which was accomplished in the record time of 18 working days, was performed on the T-2 tanker *Elk Basin*, recently purchased from the U. S. Maritime Commission by General Petroleum Company. It far exceeded requirements set up for this type of vessel by the U. S. Coast Guard and the American Bureau of Shipping in that 8 straps were installed instead of 4. This was because it was General Petroleum Company's wish to give further than the required protection to the ship and her crew.

The eight straps were installed as follows: one on each side of the keel on the bottom and Deck of the ship, and two on each side, one just below the sheer strake and one just above the bilge strake. Cuts in the shell and deck plating, over which these straps were riveted, were made with an oxyacetlyene burning machine specially designed by engineers at the yard. This machine will make precision flame cuts in a vertical or horizontal position which are free from any irregularities.

The two bottom straps were installed just outboard of the longitudinal bulkhead with two rows of rivets on each side of the cut. The two lower side straps were installed just above the turn of the bilge and just below the sheer strake with

(Continued on Page 80)



Top: Specially designed burning machine making lower side shell cut.

Below: Oxy-Acetylene burning machine, designed at Bethlehem Steel Company's San Francisco yard, shown making a bottom cut on the Elk Basin.

three rows of rivets on each side of the cut. The two bottom straps consisted of ⅞" plate; the lower side shell straps 1" plate and the upper side shell straps of 1¼" and 1" plate; the two deck straps 1" plate.

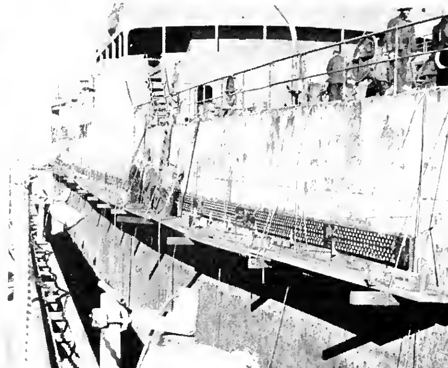
In addition to installing eight straps on the *Elk Basin*, Bethlehem's San Francisco Yard also carried out the latest recommendations of the American Bureau of Shipping as to stiffening on the center line transverse bulkheads. This additional work, which was accomplished in conjunction with the strapping, required considerable planning and coordination. This was so that after bottom straps and the lower side shell straps were installed, a flood test of the wing tanks above the side straps could be conducted to insure tightness of the straps and to eli-

(*Continued on Page 85*)

Top: Upper side shell strap.

Center: Rivet gang driving rivets on lower side shell strap. 36,000 rivets were required for the Elk Basin strapping job, all of these produced in the Bolt and Nut Department of Bethlehem Pacific Coast Steel Corporation's South San Francisco Plant.

Bottom: Completed lower side shell strap.



NEWS FLASHES

NEWS FLASHES

MATSON BIDS

Date for the opening of bids for the reconversion and modernization of the SS MONTEREY has been postponed from January 30 to February 27 at the request of the interested shipyards. Bids are being taken on partial completion and full completion. It is understood that the Mariposa will go to the yard that gets the Monterey.

* * * * *

MATSONIA FOR SALE

The 17,226 gross ton passenger liner SS MATSONIA will be withdrawn from service and offered for sale when she completes her voyage from Honolulu to San Francisco on April 20.

* * * * *

LINER GEORGE WASHINGTON TO RUN TO ALASKA

The 390-foot liner George Washington, a familiar name to thousands of American coastwise travelers before World War II, has been sold to the Alaska Transportation Company for passenger service between Seattle and Alaska.

The vessel was purchased for $180,000 from the Maritime Commission but an additional $350,000 in refitting costs will be necessary to put her into shape. Bids for the work were invited from yards on both coasts.

* * * * *

UNIFRUIT AT S.F.

Postwar calls at San Francisco by United Fruit Company's banana ships will be re-established about February 26. Six of the company's newest fully refrigerated vessels--Junior, San Jose, Limon, Parasmina, Fra Berlanger and Camayagua--will serve San Francisco with an anticipated weekly discharge of 35,000 stems.

* * * * *

$50,000,000 IN TANKER CONTRACTS AWARDED

Contracts totaling approximtely $50,000,000 for the construction of thirteen new "super tankers" were awarded recently by three major oil companies as part of a program of replacing obsolete tonnage.

Eleven of the tankers are to be built by the Sun Shipbuilding and Dry Dock Company, Chester, Pa., and two are to be built by the Newport News Shipbuilding and Dry Dock Company, Newport News, Va.

Of the tankers to be built at the Sun yard, two are for the Standard Oil Company of New Jersey, New York; two for the Gulf Oil Corporation, New York, and seven for Tankers Company, Inc., to be chartered to Socony-Vacuum Oil Company,

Inc., New York. The tankers to be built at the Newport News yard are for the Standard Oil Company of New Jersey.

* * * * *

LURLINE NEARLY READY

The SS LURLINE, Matson Navigation Company's famous passenger liner of prewar days now being converted from a troop transport to her former status, will go on drydock February 29 at Bethlehem Steel Company, Shipbuilding Division, San Francisco Yard. Here the underwater body of her hull will be sandblasted and painted, her rudder will be removed for repairs, both tailshafts will be drawn for examination and two spare propellers will be installed. In addition, sea valves will be overhauled and renewed, and double bottom tanks, cofferdams, deep tanks, etc., will be tested.

The ship will be on drydock approximately two weeks, following which she will be returned to Pier 36 where her outfitting will be completed. She is scheduled to resume her regular passenger service to Los Angeles and Honolulu April 15.

* * * * *

ONE WEST COAST YARD'S BUSY SCHEDULE

USAT DAVID C. SHANKS	U.S. Army Trans. Corps	Conversion
MV ALGORAB	Pillsbury & Martignoni	Conv. & Eng. Rep.
USAT FRED C. AINSWORTH	U.S. Army Trans. Corps	Conversion
MV SILVERGUAVA	Kerr S.S. C.	Main Eng. Repairs
MV HILO	Pillsbury & Martignoni	Survey
SS HAWAIIAN FARMER	Matson Nav. Co.	Rep. & Alteration
SS MARINE SWALLOW	A.P. Lines	Routine D. D.
USAT FREDERICK FUNSTON	U.S. Army Trans. Corps	Conversion
SS HAWAIIAN CRAFTSMAN	Matson Nav. Co.	Rep. & Alteration
USAT LANGFITT (Ft. Mason)	U.S. Army Trans. Corps	D.D. & Repairs
SS COMET	U.S. Lines	Survey & Repairs
SS PRES. JEFFERSON	A.P. Lines	Routine D. D.
SS PRES. CLEVELAND (P. 46)	A.P. Lines	Misc. Repairs
DREDGE SANDCRAFT	Pac. Coast Aggregates	Survey & Repairs

* * * * *

STEEL CABLE

There is 31,000 feet of Bethlehem Steel elevator cable in the New I. Magnin Company building in San Francisco. Elevators are Westinghouse.

* * * * *

LUCKENBACH PURCHASE

In the face of its decision to withdraw from westbound intercoastal operations for the duration of the walking boss strike in San Francisco, Luckenbach Line went ahead with a program to purchase 16 C-type ships for domestic operations.

James Sinclair, president and general manager of the line, said in New York that the firm's new fleet plan envisaged the acquisition of 11 C-3 and five C-2 freighters from the Maritime Commission. It was estimated that this fleet will cost the line a minimum of $24 million. The line expects the first deliveries in the C-3 group to be made as early as October.

Despite persistent rumors that Luckenbach was planning to use the ships in offshore trade, Mr. Sinclair insisted that the entire fleet would be used in the domestic trades as long as the volume of cargo was sufficient to keep them full.

* * * * *

INDUSTRIAL DEVELOPMENT IN SOUTHERN CALIFORNIA

During the month of December, 15 new factories were established in Los Angeles County with a total investment of $1,591,000, and creating 490 new jobs for factory workers. Thirty-five existing plants were expanded, calling for an additional investment of $3,399,000 and creating 885 new industrial jobs.

Total investment in the 50 new and expanded units was $4,990,000, creating a total of 1,375 new jobs.

For the year to date, 215 new factories were established with a total investment of $69,852,000, and creating 7,811 new jobs; 417 existing plants were expanded, calling for an additional investment of $54,959,500, and creating 13,535 new industrial jobs.

Total investment for the year to date in the 632 new and expanded units was $124,811,500, creating a total of 21,346 new jobs.

* * * * *

A SMALL ITEM OF WORLD TRADE

President W. R. Herod of the International General Electric Company Inc. has announced that a contract has been signed in Buenos Aires between General Electric S.A., Argentina, and the Argentine State Railways, under which General Electric will supply Argentina with 95 diesel-electric locomotives within the next three years.

Covering 60 single-unit and 35 double-unit engines, plus spares, the contract will approximate $18,000,000, Mr. Herod said. Deliveries are scheduled to begin early in 1949 and will continue for a 15-month period.

* * * * *

ARMY SHIPPING

San Francisco Port of Embarkation sent 6,520,762 measurement tons of cargo overseas to Pacific bases in 1947.

Fully 90 per cent of the total cargo was carried in commercial bottoms operated by private shipping firms. Of the more than two and one-half million tons lifted in the San Francisco Bay Area every ton handled at Army piers was loaded by private stevedoring firms operating under Army contracts and that moving over commercial piers was handled by the shipping firms themselves.

* * * * *

NEW PIER AT LONG BEACH

Award of contract for the $2,697,970 worth of pier construction which will create thirteen additional berths at Long Beach Harbor was made recently. Two pier building jobs involved in the contracts are the extension of Pier B and creation of a new Pier C midwise in the Outer Harbor, running southward from El Embarcadero. The 500-foot wide Pier B will be extended southward for 1200 feet and Pier C will measure 600 by 2476 feet. The project will create more than 40 acres of new land in the Long Beach Harbor Area. It is expected that the construction on the new 1150-by-200-foot transit shed on Victory Pier, which was awarded several weeks ago, will start promptly.

* * * * *

GENERAL ELECTRIC AWARDS SAN JOSE PLANT CONTRACT

The general contract for the construction of the new two million dollar G-E motor plant in San Jose has been awarded to Parker, Steffens & Pearce, San Francisco, according to an announcement by John Hood, Manager of the General Electric Company's Oakland works which includes San Jose manufacturing. The plant will be completed and operating by Fall.

* * * * *

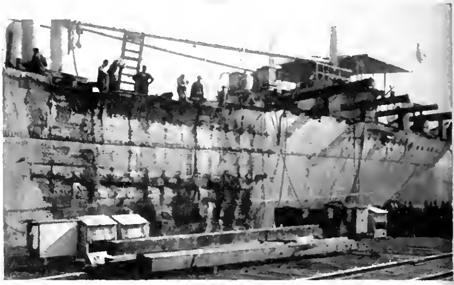
DUTCH SHIPPING NEARING 1939 LEVEL

The Netherlands merchant fleet, half of which was lost during the war, is nearing prewar levels, according to a report reaching here from Holland. The nation's present total shipping tonnage is approximately 2,450,000 tons compared to 2,875,000 in 1939.

Shipping of approximately some 300,000 tons is currently being built, while the purchase of more American vessels is being negotiated. It is the aim to achieve the country's 1930 total of 3,000,000 tons.

NEW STACK

COLLISION DAMAGE



Above picture shows damage suffered by the 4,883-ton diesel freighter Brimanger in a recent collision off Baranquilla, South America, with the Grace Line vessel, Santa Monica. The Brimanger, built in Newcastle, England, in 1929 and owned by the Westfal-Larsen Co., is shown at Bethlehem Steel Company, Shipbuilding Division, San Francisco Yard, where damage to her shell plating, after quarters and internal frame members is being repaired. General Steamship Company are agents for the vessel.

◀ U. S. Army Transport, David C. Shanks, gets new streamlined stack. This ship is now undergoing a modernization-conversion at Bethlehem Steel Company's San Francisco Yard. The stack, 28 ft. high, 25 ft. long and 15 ft. wide, is made of ¼" aluminum plate reinforced with steel and aluminum bracings. It was completely fabricated and erected by Bethlehem.
The U. S. Army Transport, Fred C. Ainsworth, also undergoing a conversion at Bethlehem's San Francisco Yard, will get a similar stack in the near future.

TODD MAKES THREE CONVERSIONS ON ONE FREIGHTER

The *Muhlenberg Victory,* which made the news last year as a specially-constructed cattle carrier taking beef on the hoof to Europe for the starving millions, entered the Todd Brooklyn shipyard during December for what is considered to be the largest bottom job ever performed by Todd on a freighter. She ran aground last October off San Juan, Porto Rico, and the resultant damage requires the renewal of 80 plates, the repair of 30 more, and the replacement of more than 50% of the "floors" in the double-bottom.

The bottom of the Muhlenberg Victory presents a honeycomb effect on the drydock at the Todd Brooklyn shipyard after nearly all of her plates have been burned away.

The *Muhlenberg Victory* is a familiar tenant at the Todd yard, which twice previously converted her for new service. In June, 1946 Todd converted the cargo-carrier to a troopship; then about a year later, changed her once again, this time to a bovine boat, complete with "first class" accommodations for 860 beefy passengers. About a year ago, she was converted once more back to her original status as a cargo carrier and chartered from the Maritime Commission by the Porto Rico Line.

After the repair job, which also includes opening up her turbines for inspection and overhaul where necessary, she will be returned to the Maritime Commission.

Strapping Job

(Continued from Page 80)

minate the problem of flooding the centerline tank.

Another important feature of the work on the *Elk Basin* was the installation of a three-cargo pipe segregation system, enabling the vessel to carry three types of oil cargo at any one time without the danger of one contaminating the other.

On completion of the above work, all wing cargo tanks, port and starboard were filled and headed to 8′ above the main deck to insure tightness between the tanks and to check the stoppers in way of the newly installed straps. In connection with this work it was also necessary to remove and relocate a total of 16 wheel stands and operating rods and install new ones for operating the new 3-cargo pipe segregation system.

In addition to strapping the *Elk Basin,* installing a 3-cargo pipe segregation system and performing various structural modifications, Bethlehem also performed normal voyage repairs on the vessel, removed the complete mechano flight deck, the gun foundations fore and aft, the magazine in the fore peak and after peak tanks and restored these tanks to the required additional stiffening of their original design.

All strapping and structural modifications were performed under U.S. Coast Guard and American Bureau of Shipping inspection.

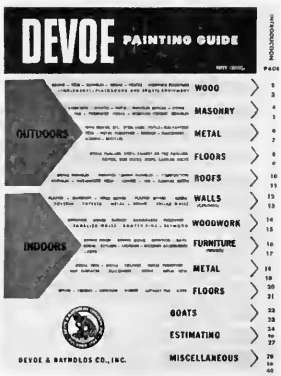
Painting Guide

The Sales Training Department of Devoe & Raynolds Co., Inc., has just released a book entitled "Devoe Painting Guide."

The book was written to insure the proper use of paint and related materials. The method of painting each major type of surface — walls, furniture, woodwork, floors, etc. — is given on a single double page spread which also gives spreading rates, drying time, surface preparation and a short description of the products recommended.

Its unusual cover is the index, which simplifies locating any desired information. No reading through unnecessary materials to find what is needed immediately.

Copies may be obtained by sending 50 cents to Sales Training Dept., Devoe & Raynolds Co., Inc., 787 First Ave., New York 17, N. Y.



Sperry Introduces Magnetic Compass Pilot at Motor Boat Show

Reliable means for automatic, unattended steering for yachtsmen, fishermen and work boat operators was the central feature of the Sperry Gyroscope exhibit at the thirty-eighth annual National Motor Boat Show. It is called the Magnetic Compass Pilot.

Prior to its public debut at the show, a few models were installed for operational testing on fishing boats and yachts. "It tends the helm, while we tend the nets," is the thumbnail description given the Sperry pilot by a dragger skipper operating off Long Island. In other words, for fishermen and commercial operators, such automatic control relieves the helmsman for other duties when an extra "hand" is most needed.

The Magnetic Compass Pilot is the first of its kind in that it successfully combines a standard magnetic compass with reliable control mechanisms. The equipment is simple and easy to operate, and Sperry officials forecast its use by craft as small as 25-30 feet. Using either 32 or 110 volt DC, the pilot requires very little power.

A controller, with a knob and course indicator, is attached to the top of a standard magnetic compass. An operator turns this knob to "dial his course", and the boat will turn to course and hold it automatically until a new course is set in. This is done by a pickoff which senses the compass reading and applies control through an electronic amplifier to the steering engine.

A component of the equipment is a remote controller. It is a small, hand-held device with a flexible cable which permits rudder changes to be made from any point on deck away from the helm.

Operation of Sperry Magnetic Compass Pilot (forward of helm) is observed by Frank H. Wheaton, Jr. aboard his yacht Framar.

Portable Cleaner Stand Saves Time

The Tivit Portable Parts Cleaner Stand manufactured by Kelite Products, Inc., Los Angeles, is a sturdy welded steel unit, which can be wheeled right up to the job. It holds a standard five-gallon can of Kelite Formula 555—a new fire-safe, quick-acting cleaner—and a five-gallon rinse can.

The mechanic merely drops the grimy parts into the basket as they are removed from the job. After a short soak the basket is lifted out and dunked in the rinse can. Parts come out clean and bright—easy to repair and reassemble.

Lamont Given Honor Award

For his wartime services in the field of shipbuilding, R. J. Lamont, vice president of Todd Shipyard Corporation, recently received a Presidential Certificate of Merit.

Lamont, wartime head of the Todd-Pacific Shipyards, was presented formally with the award by Rear Admiral George H. Fort, 13th Naval District commandant, at the Seattle Naval Station.

The citation, signed by President Truman, praised the Seattle executive for "outstanding fidelity and meritorious conduct in aid of the war effort against the common enemies of the United States and its allies in World War II."

The Harbor Island yard at Seattle which Lamont headed produced a fleet of destroyers, several of which made sea history in battles against Axis navies.

R. J. Lamont shown with Rear Admiral George H. Fort, 13th Naval District Commandant, Seattle Naval Station.

Westinghouse Booklet Describes Point-to-Point Communication Equipment

The new point-to-point radio communication equipment is described in a new booklet of the Westinghouse Electric Corporation. Typical applications for this equipment are: ship-to-shore; between airports; and industrial communication systems such as mining, lumbering and construction.

This 8-page booklet shows the adaptability of the Westinghouse type MV equipment to cover all radio communication demands by offering all these types of service from one transmitter: on-off telegraphy, frequency shift keying, facsimile, MCW and radio-telephony.

The center spread chart illustrates the inherent "building-block" design, by which only those units needed to perform specific tasks need be incorporated in any final assembly.

Copies of the booklet (B-3945) may be obtained from the Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

Stability and Trim Experimental Tank

(Continued from Page 51)

evaluated. The Cadet-Midshipman at this point in the course is well acquainted with stability principles. The reader of this article who is not similarly equipped may find the demonstration somewhat difficult to follow.

Demonstration 11—Free Surface

Objectives

1. To show the effect of slack tanks on a vessel's stability.
2. To show how the effect of free surface on metacentric height and the stability curve can be calculated and used to advantage in correcting or preventing a poor stability condition.

Facilities and Equipment

1. Tank and model (Inclining gear attached).
2. Meter and hose.
3. Ballast weights and adjusting blocks.
4. Graph paper.

General Description of Demonstration

Select any given condition of displacement and GM. Flood one or more tanks so that in each case the tank is slack. Calculate the GM and draw up a statical stability curve for the condition. The free surface correction table may be used to make corrections to initial stability. In drawing up the statical stability curve it must be remembered that the reduction in righting arms due to the virtual rise of the center of gravity is only valid for initial stability, that is, for about 10 degrees of inclination. The free surface correction may increase very slightly for moderate angles of inclination, then decrease rapidly as "pocketing" occurs. The extent of these changes will vary with the length-breadth ratio of the tank and the depth of water within the tank. If the virtual GG' is used to calculate the correction to righting arms for *all* angles of inclination the curve will show less stability than the vessel actually possesses at large angles of inclination. There is no known method of rapidly computing the actual reduction to righting arms at larger angles of inclination due to "pocketed" free surface.

In the demonstration pocketing should be ignored in drawing the calculated curve; inclining the model and measuring actual righting arms will produce the proper curve. The Cadet-Midshipman will then be able to make up his own mind on any possible approximation for increasing righting arms at large angles over that calculated.

Demonstration 11—Free Surface
Data Sheet
Displacement Condition 2 (c)

	Weight in lbs.	VCG	Vertical Moments			
Model, light	1035	10.8	11178		KM	14.20 in.
100 lb. weights	400	11.0	4400		KG	12.91 in.
Top weights	135	35.0	4725		GM (—)	1.29 in.
No. 3 Hold, flooded	200	13.0	2600			1.51 in.
Compensating				(Free Surf.)	GG'	1.51 in.
Other (Blocks)	30	11.0	330			
TOTALS	1800		23233	(Corrected)	GM (—)	.22 in.

STEP 1: Calculate GM, corrected for free surface as above

STEP 2: Draw a statical stability curve for this condition. (See Graph)

STEP 3: Incline the model. Compare actual stability characteristics with stability characteristics as shown in calculated curve.

STEP 4: Conclusions.

REMARKS:

1. BALLAST ADJUSTING BLOCKS USED TO CHOCK OFF 100 LB. WTS.
2. GRAPH REVEALS A LIST OF SOME 10° OR 11°, ALTHOUGH RIGHTING POWER IS NEARLY NIL FOR 20° OF INCLINATION. ONLY SLIGHT FORCE IS SUFFICIENT TO INCLINE MODEL PAST 10°.
3. THE CONDITION AFTER FLOODING IS EXTREMELY DANGEROUS FOR DYNAMIC CONDITIONS AND A VESSEL MIGHT CAPSIZE IN HEAVY WEATHER WITH THESE STABILITY CHARACTERISTICS.
4. THE C/M SHOULD CALCULATE THE EFFECT OF PUMPING THE WATER DOWN INTO NO. 2 DEEP TANKS.

The Department of Nautical Science at Kings Point hopes that future merchant marine officers will learn from the model, *Miss Calculation*, an expert and confident knowledge of stability which will prevent them from miscalculating when it counts; when they have to make decisions which may mean the saving or loss of their ship and their shipmates.

BOOK REVIEWS

PRISCILLA OF FALL RIVER, by Roger Williams McAdams; published by Stephen Daye Press. Price \$3.75; 224 pages; 6¼" x 9½".

The *Priscilla*, which made her first voyage on June 25, 1894, was the acknowledged queen of the Fall River Line. She was beloved by millions of Americans who knew her during the forty-three years she sailed Long Island Sound.

Priscilla of Fall River contains many amusing episodes and exciting tales of danger and heroism. It adheres strictly to fact, although it is written in conversational style and moves like a novel. The author is a recognized authority on this era of American life. He is the grandson of a Rhode Island builder of sailing vessels, growing up in the tradition of Sound shipping, and his life and experience have been closely interwoven with the history of which he writes. The *Priscilla* had a long life, and her story makes good reading.

TROOPSHIPS OF WORLD WAR II, by Roland W. Charles, Naval Architect, with foreword by Maj. Gen. Edmond H. Leavey, Chief of Transportation, U. S. Army. Sponsored by The Army Transportation Association. Price \$3.25; 374 pages; 6" x 9"; 360 illustrations.

Here in one volume is packed authentic and detailed information about the vessels, large and small, that were utilized in the biggest ocean troop movement in history. The naval architects and engineers who designed these ships, the shipbuilders and yard workers who constructed, converted or repaired them, and the millions of troops who rode them into battle zones, will find this book a treasured lore. Libraries, ship owners and operators, marine insurance and salvage companies, custom house brokers, stevedoring companies, newspaper offices and all others interested in ships will find *Troopships of World War II* indispensable as a reference work.

GOVERNMENT OWNERSHIP

(Continued from Page 61)

light turns to premiums, on commissions, on conditions, on the agency system, on the whole industry itself. And being flexible the industry moulds itself to meet new circumstances. The moulding is not always easy and many interests are frequently involved, but friction is avoided by co-operation between representative bodies, and I, for one, look forward to the time when all those bodies in the industry will be knit even closer together than they are at present, so that insurance can be developed on the best possible lines to an unassailable position."

A NEW BOOK

"Lloyd's: By An Observer," is the title of a timely article in "Lloyd's Diary for 1948," printed and issued by the Corporation of Lloyd's, London, England. After pointing out that the history of Lloyd's goes back for over two and a half centuries to the year 1687-8—at that time it was a coffee house in the City of London frequented by shipowners, seafaring men and merchants who had a common interest in shipping and marine insurance—the article proceeds:

"In spite of the growing complexity of business and the increasing supervision of the Committee, in spite of the many changes necessitated by two world wars, in spite of restrictive foreign legislation, the spirit of free underwriting and the exercise of individual judgment remain.

"From 1940 to 1945 war cut the connection between Lloyd's and many of its friends in Europe, but the old ties, one by one, are being restored; former policyholders are turning to Lloyd's again; and as men revert to the normal routine of commerce, as the economic problems that War bequeaths to Peace are solved, as exchanges thaw and the chains are removed from international trade, Lloyd's Underwriters are rendering again their traditional service to the World."

FACE-LIFTING JOB

Being converted to a cargo carrier, the former LSM 61 gets a "face-lifting" treatment at Bethlehem Steel Company's Staten Island Yard. Weighing 56,000 pounds and extending 40 feet in length, 20 feet in height and 26 feet in width at its widest, the new peacetime bow being swung into place here was prefabricated at the yard and replaces the craft's former landing-ramp bow. The vessel also will be fitted with an after pilot house, stack, cargo booms and hatches for the Portuguese coastwise trade.

Ship Forms

(Continued from page 40)

resistance of a new ship by Taylor's Standard Series or any other, for that matter, is that the horsepower curve so derived is not that of the new ship—it is merely that for a Standard Series form having the same hull characteristics as the new ship. Since Taylor's parent form was that of a fine-lined naval vessel, his curves were for many years useful only for estimating the resistance of high speed passenger vessels. The slow cargo vessels were far out of range. With today's cargo vessels approaching the speeds of yesterday's passenger ships, the model tank curves are falling nearer the results of a Standard Series calculation. Some beamy shallow draft vessels will have less resistance than that indicated by Taylor's curves.

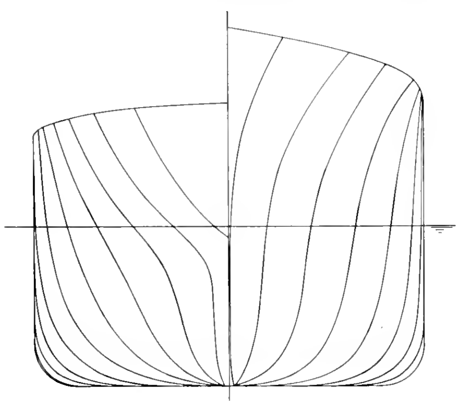
In 1927 A. L. Ayre presented a method of approximating the effective horsepower of a new ship which was based on the results of some model tests as well as general practice. Additional model tests showed the need for revisions which were published in 1933. By this method

$$\text{E.H.P.} = \frac{D^{.64} \times V}{C_2}$$

where C_2 is a coefficient whose basic value is taken from a set of curves by entering with $V/\sqrt{L}$ and $L/D^{1/3}$. The value obtained is then corrected for variations in beam-draft ratio, block coefficient and position of the longitudinal center of buoyancy. The standard beam-draft ratio is 2.0, the standard block coefficient is $1.08—V/2\sqrt{L}$ while the ideal position of longitudinal center of buoyancy is as follows in terms of percentage of ship's length forward or aft of the midship station:—

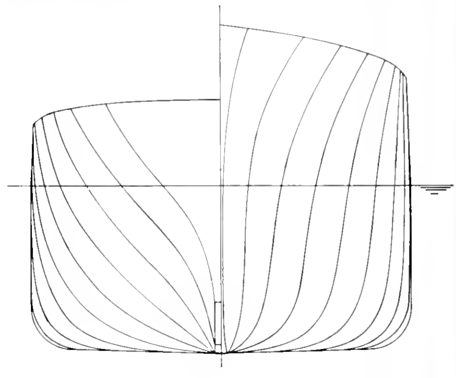
$V/\sqrt{L}$	0.5	0.6	0.7	0.8	0.9	1.0
Single Screw, o/o	2F	1.9F	1.6F	1.2F	0.2F	1.1A
Twin Screw, o/o	1F	0.9F	0.7F	0.2F	0.8A	2.1A

These positions for the longitudinal center of buoyancy are based on McEntee's experiments of 1918; recent experiments seem to point to a slight movement aft of the values noted.



TYPICAL SECTIONS - SINGLE SCREW CARGO SHIP
BLOCK COEF - .674 PRIS COEF - .683 MIDSECT COEF - .987

In Great Britain, it is common practice to give the results of model tests in Froude's notation, i.e. by (C) curves plotted on $V\sqrt{L}$ or (P) which equals $V/1.34\sqrt{PL}$ where P is the prismatic coefficient. The value of (P) is an indication of the wave-making resistance of a particular form. The (C) curves are usually for a ship 400 feet long—Froude's original base was 300



TYPICAL SECTIONS - TWIN SCREW CARGO SHIP
BLOCK COEF - .607 PRIS COEF - .622 MIDSECT COEF - .976

feet. The correction factors for other lengths are:—

Length	Add	Length	Deduct
100	.09	450	.007
150	.066	500	.013
200	.045	600	.024
250	.030	700	.033
300	.018	800	.041
350	.009	900	.048
400	—	1000	.054

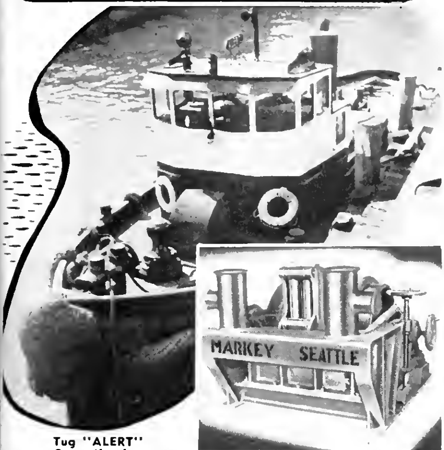
In choosing a (C) value for estimating the resistance of a new ship, all characteristics and a section area curve of the parent model should be available for comparison. For a given prismatic coefficient the (C) value increases rapidly above a certain $V/\sqrt{L}$ value—this point is determined by inspection from the curves and its value used in determining E.H.P. With present knowledge of hull forms it is possible to obtain for ordinary slow cargo vessels a (C) as low as 0.60.

While it is impossible to condense the entire procedure of ship design into a few paragraphs it will not be amiss to note a few important points relative to resistance. A ship owner desiring to build an addition to his fleet must study the requirements of his particular trade and furnish at least the following information to the naval architect:—

1. Type of cargo and required deadweight or cubic capacity.
2. Size restriction, i.e., maximum length, breadth or draft.
3. Trial or sea speed.
4. Length of trip or maximum distance between bunkering ports.

(Please turn to page 92)

MARKEY



Tug "ALERT" Operating in San Francisco Harbor.

Type TMSF Towing Winch

A TOWING TIP

"Experience and Know How" were the answers when we inquired into the phenomenal rise in popularity of Markey Towing Machines in the Bay Area. "We find it more economical to use wire rope, especially for harbor work. We save plenty in material, manpower, and over-all operation."

There's a tip in that for you. Be wise — investigate the Markey Towing Machines . . . Cut operating costs . . . Enjoy the benefits of great flexibility and absolute dependability.

Write for descriptive literature, without obligation, giving any information that will enable our engineers to give you the full benefit of Markey's sea-tested experience.

Towing Machines • Capstans • Windlasses
Hoists • Winches • Steering Engines

Represented by

Geo. E. Swett & Co., San Francisco
J. H. Menge Sales Co., New Orleans

"Let's keep our Merchant Marine —
Uncle Sam's Best Prosperity Insurance."

MARKEY
Machinery Company Inc.
SEATTLE, WASHINGTON

Thicknesses from 1/64 to 1/4 inches.
Sheets 40 x 40 inches and larger.

Feeding mix for GARLOCK 7021 into sheeters at Garlock factory.

For Extreme Pressures AND HIGH TEMPERATURES

GARLOCK 7021 Compressed Asbestos Sheet Packing was specially developed by Garlock for severe oil service. It is strong and tough, yet resilient. Gaskets cut from GARLOCK 7021 give superior service on pipe lines and other equipment handling gasoline, oil, gas or steam at extreme pressures and high temperatures.

THE GARLOCK PACKING COMPANY
PALMYRA, N. Y.
San Francisco Los Angeles
Seattle Portland

Ship Forms

(Continued from page 90)

5. Type of machinery preferred.

6. Number of passengers, if any.

Unfortunately, or perhaps fortunately for the naval architect, there is no simple formula which can be run through on a slide rule to give the dimensions of a ship from the above requirements. Speed is the primary requirement for but few classes of vessels; therefore, in normal merchant practice the hull dimensions cannot be chosen solely on the basis of low resistance. From the viewpoint of resistance, length is advantageous but added length increases the cost of building and increases the hull scantlings. Increased draft aids in reducing resistance but unfortunately this dimension is the most liable to be restricted. Adding to the beam without fining the hull form usually added to the resistance.

Passenger ships have been and probably will continue to be tailored for some particular run. Cargo ships, on the other hand, have been built for general service with a trend toward increased speeds. Fifteen years ago 10 knots was the common speed; today it is 15-16 knots and 20 knot cargo ships are proposed.

In the past it was normal practice to select a suitable block coefficient for the operating $V/\sqrt{L}$ from one of the following:—

$$\text{(Block coef.)}\ ^{2}/_{3} = 0.39\sqrt{L}/V \text{ or } V = \text{sea speed.}$$

$$= 1.08 - \frac{V}{2\sqrt{L}}\ V = \text{trial speed.}$$

Modern practice is to choose a prismatic coefficient and let the block coefficient come as it will. A suitable prismatic coefficient may be chosen from

$$\text{Prismatic coef.} = \frac{1.09}{\text{Midsec. coef.}} - \frac{V}{2\ (\text{Midsec. coef.})\ \sqrt{L}}$$

or

$$= 1.02 - \frac{V}{10\ D^{1/6}} \quad \text{or}$$

$$= 1.15 - 0.6\frac{V}{\sqrt{L}}$$

An unduly fine prismatic will increase length of a given displacement with the attendant disadvantages previously noted.

When choosing a prismatic coefficient the value of (P) should be investigated as an indication of wave-making. When $(P) = \sqrt{4/1}, \sqrt{4/5}, \sqrt{4/9}, \sqrt{4/13}$, etc. the form will have high wave-making resistance; low wave-making is indicated by $(P) = \sqrt{4/3}, \sqrt{4/7}, \sqrt{4/11}, \sqrt{4/15}$ etc. Should a poor value of (P) be unavoidable, the critical values may be shifted a little up or down on the speed scale by the use of straight or hollow entrance lines respectively. A particularly bad combination of a wave crest at the bow with a hollow at the end of the entrance is indicated by $V = 1.09\ \sqrt{\text{Length of entrance}}$. Under no circumstances should this occur in conjunction with a poor (P) value. The spreading of the entrance and run shoulders will help to reduce critical wave combinations.

Once the dimensions and coefficients of form of a new ship have been settled the following are the important

(Please turn to page 94)

New "Package" Steam Generator by Foster Wheeler

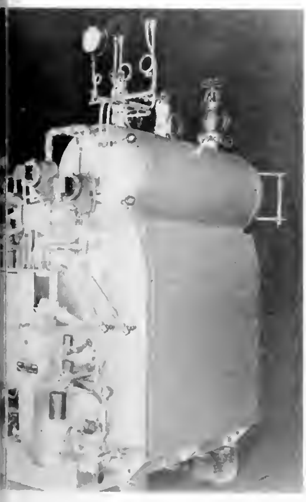
Foster Wheeler Corporation, New York, announces its entry into the field of package steam generators up to and including 27,000 lb. per hour range. These Foster Wheeler units are assembled at the factory, including refractory and insulation, and are ready to generate steam when delivered and installed.

Designs immediately available provide for both oil and gas-firing, and a coal-fired unit will be ready shortly. Two series, low pressure (up to 250 lb.), and high pressure (up to 850 lb.), are being produced at present.

Basic engineering design provides for installation of superheaters either as original equipment or for later addition. This means that plant operators are being offered complete steam generators, factory-built, which embody the same features found in central station units.

Combustion controls provide full or semi-automatic operation, as desired, and are an integral part of the "package". Operation of the units from a central control panel is simple—only a minimum of attention is necessary.

A bulletin containing full information is available on request.



New Catalog of Tube Cleaners

Thomas C. Wilson, Inc., has introduced a new catalog of tube cleaners covering the complete Wilson line of tube cleaners for use in refineries, power plants, marine boiler rooms, locomotives, and chemical process plants. The catalog, containing 48 pages, is printed in three colors, and is replete with excellent illustrations and conveniently arranged tables.

Virtually every type of cutter-head is described in detail, as well as brushes and air, steam, and water driven motors. Electrically-driven tube cleaning equipment and all accessories are also described and illustrated. One section of the book is devoted to special equipment and shows a variety of "custom-made" cleaners which are typical of the solutions which Wilson technicians have developed to meet difficult and unusual tube cleaning problems.

All listings are organized for easy reference, and include application data as well as technical information, operating hints, and other pertinent data. Copies of Wilson's Tube Cleaner Catalog No. 76 may be obtained by writing to Thomas C. Wilson, Inc., 21-11 44th Ave. Long Island City 1, N. Y.

Ship Forms

(Continued from page 92)

items that affect resistance:

1. The shape of the sectional area curve.
2. The shape of the load waterline, particularly at the fore end.
3. The shape of the sections at the ends.
4. The type of stern.

F. H. Todd notes the following features governing ship performance:

$V/\sqrt{L}$	Below 0.5	0.5	to	1.0	Above 1.0
Best type of bow water lines	convex with fairly large entrance angles	hollow and small entrance angles	becoming	straight with increases in V/L	straight with medium angle of entrance
Best position of L.C.B.	forward of midships	aft of midships	changing to	midships at high speed	amidships

At the stern, bow wave-making is automatically guaranteed if the lines are carefully drawn to eliminate eddies. The length of run may be determined from

$$L_R = 4.08 \sqrt{\text{Midsection Area}}$$

which is to be measured from the stern frame and not the after perpendicular on single screw ships. While Froude's general observation that V-sections are helpful in reducing wave-making at the stern is still true, studies of lines of flow to the propeller disk indicate that for good propeller action a more U-shaped section—sometimes known as the club-footed section—is to be preferred. A rounded waterline aft is suitable for slow speed vessels but for high speed it should be nearly straight and drawn out as far as possible; a deep cruiser stern is helpful in accomplishing this. After waterlines should not exceed a slope of 20° from the centerline as far aft and as high as possible but must fair into the stern frame without an abrupt change of shape.

If U-sections are used at the bow, care must be taken to avoid flat spots on the bottom which may be liable to damage from pounding. The bow profile on fast vessels should have a decided slope forward with a good cut away to meet the requirements of a fine-ended sectional area curve without creating sections that are structurally impractical.

While the form of the immersed body of a ship is usually the naval architect's main concern, the above water shape must not be overlooked. Vertical stems with sharp flares high up tend to slow down a ship when pitching into head seas; the flare should start from as near the load waterline as possible and be gradual. Raking the bow profile forward in conjunction with a rounded stem in place of the old style bar will enable the above-water lines to be drawn in nearly parallel to the load waterline.

In shaping a cruiser stern above the water, care must be taken that it is not too U-shaped in section. The added frictional and eddy resistance of such a stern will seriously affect the speed when the ship is pitching in heavy weather. This was demonstrated by the M. V. *Silverpine* which was designed for 10 knots and made 11.85 in ballast on trials. The owners required a large poop space which gave full lines above the water at the stern. In heavy weather her speed fell to an average of 6 knots.

Thus, in brief, are some of the important steps in the development of hull forms and the continuing studies of ship resistance. In spite of the vast storehouse of modern knowledge of hull forms and their resistance, it is still possible to design a poor ship—naval architecture remains an art as well as a science.

Typical (C) Curve Data Calculated from Published Curves:—(C) on Basis of 400 Foot Ship

Type:	Cargo	Cargo	Pass. & cargo	Pass.
Length	204′	465′	486′6″	690′3″
Breadth	38′	69′6″	64′	91′11″
Draft	14′	30′	26′	32′6″
Displ.	1961	18700	14027	35440
Pris. Coef.	.666	.688	.631	.600
Block Coef.	.618	.675	.607	.586
Midsect. Coef.	.927	.982	.961	.977
Des. Speed	12½	16½	16½	22
$V/\sqrt{L}$.	.875	.765	.749	.837

V	(C)	V	(C)	V	(C)	V	(C)
9	.765	9	.737	10	.745	15	.757
10	.833	10	.737	11	.727	16	.753
11	.833	11	.714	12	.717	17	.750
12	.924	12	.697	13	.707	18	.755
13	1.004	13	.705	14	.704	19	.763
14	1.315	14	.702	15	.707	20	.770
15	1.695	15	.706	16	.714	21	.778
		16	.707	17	.732	22	.784
		17	.729	18	.712	23	.805
		18	.788	19	.862	24	.860

Good Neighbor Fleet

(Continued from page 45)

Santos, Montevido, and Buenos Aires. On her northbound voyage she will touch the same ports in the reverse order, and will also call at Port-of-Spain, Trinidad. Later, when the two sister ships, the *Brazil* and the *Uruguay* return to service, the fleet will make fortnightly sailings calling at the ports listed.

POLLUTION OF NAVIGABLE WATERS

(Continued from Page 48)

in the harbor. The following table shows various types of vessels and facilities involved in the violations:

Tankers	Passenger and Cargo	Cargo	Barges	Tugs	Oil pipe lines—Marine Terminals
116	29	59	3	2	22

Approximately 27 of the preceding cases have been successfully prosecuted by the United States and 213 by the State of California. Generally, where the State has successfully prosecuted a case, Federal prosecution has not been recommended. A number of cases have not been prosecuted by the United States because the spill was not due to negligence, or was minor, and a clean-up crew was promptly ordered to remove the oil. In such cases, a warning or reprimand by letter has been deemed sufficient.

Over a period of 10 years (1936-1946), approximately 33 complaints concerning the violation of the refuse and debris laws were investigated by this office and developed into cases. Some of these violations consisted of disposal of garbage into the navigable waters, dumping of trash and industrial waste into streams emptying into navigable waters, dumping of raw sewage into navigable waters, pollution of beaches, etc. Of these 33 cases, 11 were referred to the State and were successfully prosecuted. This office recommended four cases for prosecution by the Federal Government and one conviction was obtained. Prosecution was not recommended on the remaining 18 cases, but letters of warning or reprimand were sent to the violators.

TODD GETS TRIPLE ARMY TRANSPORT JOB

Three large Army transports entered the Todd Brooklyn shipyard within the past month for modification and overhaul, the second phase of a general program of repairs and rehabilitation of Army vessels undertaken within recent months. The latest arrivals are the 496-foot C-4 types *General Ballou,* and *General C. H. Muir,* which entered the yard on December 5 and 10 respectively, and the 622-foot *General W. P. Richardson,* which was berthed December 15.

The *General C. C. Ballou* and *General C. H. Muir* will both undergo the same modifications as were completed recently by Todd on the *General Callan* and *General Harry Taylor.* This is part of the Army Transportation Department's "Safety-at-Sea" program to bring its active transports within the very latest Coast Guard regulations. The improvements include changes to insure watertight integrity, a complete new lifeboat set-up for the full capacity of 1650 persons, extensive fire-retarding installations in the form of Marinite bulkheads and magnesite decking throughout, overhaul of the fire alarm system and replacement of fire extinguishing chemicals.

The *General W. P. Richardson,* which was built for the Navy in 1944, and turned over to the Army in 1946, is being generally overhauled to be restored to her original condition prior to being turned back to the Maritime Commission.

The work on the two C-4's is expected to take at least two months each, while the *Richardson* will probably require less than a month's lay-up for repairs.

Two of a trio of Army transports now at Todd Brooklyn yard for modification and repair. The 622-foot General W. P. Richardson (left) is in for a general overhaul before being turned back to the Maritime Commission. The General C. H. Muir is in for a complete modification in the Army's "Safety-at-Sea" program to meet the latest Coast Guard regulations. The General C. C. Ballou, a C-4 type, like the Muir is berthed out of sight behind the Richardson, and is getting a similar going-over before they both return to the New York-Bremerhaven troop-ferrying service.

Water Treatment

(Continued from page 55)

traced to one or a combination of the following:

1. Low pH of the boiler water.
2. Dissolved oxygen entering the boiler with the feedwater.
3. Sea water entering the boiler with the feedwater.

Low pH causes general attack or corrosion of the metal surface. Carbon dioxide or sea water will cause low pH. The remedy for this situation is to add sufficient alkali with the treatment to raise the pH to the desired value, namely 10.5 or greater. Caustic soda is to be preferred for this purpose since soda ash breaks down to give off carbon dioxide in the boiler, which carbon dioxide will make the steam corrosive.

Dissolved oxygen is the usual cause of pitting of metal. Low pH aggravates or increases the pitting. (Figs. 2, 3, and 4.)

In general two procedures are followed for eliminating corrosion from dissolved oxygen:

1. The source of the dissolved oxygen is found and eliminated.
2. Chemical treatment is applied to the boiler water.

With respect to 1., in finding the source of the dissolved oxygen, it is often necessary to make dissolved oxygen tests. That is, samples of representative waters are tested for oxygen and in this manner the source located. Pumps and traps are the usual sources and of course occasionally an unknown leak is found, oftentimes in a connection normally thought to be closed. Proper operation of the deaerator, of course, also is required in order to hold the dissolved oxygen as low as possible. In an effort to eliminate all corrosion from oxygen, especially at high pressures, an oxygen scavenger such as sodium sulfite is desirable.

Sea water also may cause serious corrosion, due chiefly to magnesium chloride present. This material may react with water by a process called hydrolysis to form free acid (HCl) which of course is very corrosive. Fortunately maintaining the proper alkalinity, that is a pH above 10.5 counteracts this effect and will eliminate this type of corrosion.

Caustic embrittlement is a special form of corrosion that takes place when a leak permits a very high concentration of the boiler water to take place. At this high concentration the caustic soda or sodium hydroxide present in the concentrated boiler water attacks steel under certain conditions and causes it to become brittle. The problem of caustic embrittlement has been combatted in two ways.

1. By improved design of equipment, for example elimination of seams and rivets by using welded construction.
2. By chemical treatment with inhibitors. Materials known to be effective in preventing embrittlement are nitrates, tannin and possibly phosphate.

Another problem of the corrosion type is the corrosion of steam and condensate piping. Such corrosion is usually due to low pH water, although disolved oxygen may accelerate this type of corrosion. The source of the carbon dioxide is leakage of air and the breakdown of bicarbonates and soda ash used as a water treatment in the boiler. Because of the latter, soda ash should not be used as a water treatment for marine use. The method of combatting this type of corrosion is to raise the pH of the steam and condensate to a value between 7.0 and 8.5 at which pH steam is not corrosive. Volatile alkalies are available for this purpose.

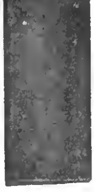
Scale and Sludge

Scale and sludge problems usually can be traced to dissolved solids which enter the boiler due to sea water leakage into the feedwater, or to the use of make-up containing scale forming salts. Cement washed tanks are often a source of scale forming salts. With respect to distilled make-up, great care should be exercised to eliminate carryover from evaporators which of course will contaminate the distillate. In general, scale is formed by the calcium and magnesium compounds which enter the system in the above manner. Figure 5 shows a bad case of scaled tube.

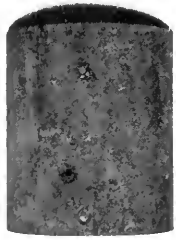
The only sure way to prevent scale and sludge difficulties is to remove these materials from solution either in the feedwater or in the boiler water and to condition the precipitates so formed so that they will not adhere to metal. The actual removal from solution is done by the addition of chemicals either soda ash or sodium phosphate. By so doing, a sludge is formed which eliminates the danger of true scale but there is still danger of sludge baking on to metal. Because of this danger of baked-on scale, a coagulant is often used to "condition" the sludge so that it will not adhere. Organic coagulants have proven highly successful in this respect. The action of the coagulant is twofold.

1. It coagulates the particles or gathers them together giving them sufficient weight so that they drop rapidly to the lower parts of the boiler where they can be blown out.
2. It acts as a protective colloid, that is, it coats the particles with a layer of organic material which makes them non-adherent to each other as well as to metal.

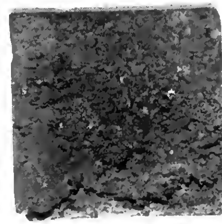
In the case of scotch marine boilers, it is common to operate with low or near zero hardness either with or



General etching or attack.



Pitting on boiler tube.



Pitting in piece of boiler feed trough.

Pit in boiler tube. Shiny material is copper around pit.

WATER TREATMENT

(Continued from Page 98)

without the use of phosphate. In many cases good results are obtained without the phosphate, though with some types of water the phosphate is necessary to eliminate scale. In all cases better results are obtained if a coagulant is used along with the chemical treatment. At high pressures phosphate is almost always necessary to insure satisfactory results. In fact, excess phosphate should be maintained in the boiler water at all times. If this is done there is little danger of true scale even if silica is present. Since phosphate sludges are troublesome from the standpoint of adhering to metal as baked-on deposits and also may cause carryover, good coagulants should be used to supplement the regular chemical treatment.

Oil and grease are often a problem in marine water treatment. In combatting these difficulties their source should be eliminated if possible. Small amounts of oil and grease can be eliminated in the boiler through the use of proper coagulants, for example, organic colloids.

Evaporators have been designed to operate indefinitely in some cases with physical cleaning only but in most cases some scale forms and the efficiency is impaired.

Exceedingly bad case of scale leading to overheating and reaction of water and steam with the tube metal.

Chemical treatment has been found to be very effective in eliminating deposits from evaporators, both evaporating fresh water and salt water.

Foaming and Priming or Carryover

Priming which is the "spewing or belching" over of boiler water with the steam, is usually due to design and operational characteristics. These factors, therefore, are to be investigated in eliminating priming. Foaming, on the other hand is a function of the condition of the boiler water. Foaming is caused by the combined effects of dissolved solids and suspended matter in the boiler water. These materials cause steam bubbles as they rise through the boiler water to become stabilized and they collect as foam on the surface of the water.

Since foaming is caused by the joint effect of dissolved and suspended solids, reduction of either will decrease foaming. Blowdown is the only manner in which the dissolved solids can be decreased but the suspended solids can be decreased in another way, namely through the use of a coagulant. The coagulant causes the suspended material to settle out into portions of the boiler from where it can be blown out. Through this reduction of suspended matter, foaming is decreased or eliminated. Bottom flash blows are required to eliminate suspended matter in this manner.

Control of Treatment and Instruction of Personnel

The use of water treatment without proper control and instruction may be compared to the operation of a steam plant without adequate meters, thermometers and gages. For this reason great emphasis must be placed on these aspects of water treatment.

For proper control of the treatment, a test kit is necessary. This kit makes possible the ready determination of the chief constituents in boiler water. As a ready means for interpreting the results of these analyses, charts have been found very helpful. These charts have columns, for example, for hardness, alkalinity, etc. After making the analysis the hardness value, for example, is referred to the chart and directly opposite, the corrective measure to be applied is listed. This takes the guess work out of water treatment and makes possible very exact control. Charts are available for various types of boilers at low and high pressures.

Conclusion

Much progress has been made in recent years in water treatment. Methods are now available for completely eliminating corrosion, scale and carryover. Through proper use of these methods and the maintaining of proper control, good results are obtained, provided personnel are instructed properly in the use of the method. Through a combination of these factors excellent boiler operation is insured.

TUNA CLIPPER SAFETY

(Continued from Page 63)

any method of holding it open. The Hydro-Hinges will at least close the door when someone goes in or out. In case of emergency the door can be dogged shut but for ordinary ingress and egress the Hydro-Hinges will hold it shut.

No. 11 Engine Room Bulkhead

Bulkhead at the after end of the engine room to be watertight in all vessels with the piping made tight at the bulkhead and a stuffingbox or suitable collar fitted at the shaft. If a door is fitted to the bulkhead at the after end of the engine room leading to the shaft alley in wood and steel boats, it must be watertight.

The intent here is to have a bulkhead that is pump tight—that is if a small amount of water gets into the vessel it will be confined until it can be disposed of. Also the intent is that the bulkhead will be sufficiently tight to be of value for salvage purposes.

No. 12 Engine Hatch Grating

A low coaming 6" high to be built around the engine hatch grating and the companionway opening to the engine room ladder within the forecastle.

The purpose is to have some small measure of protection against water that enters the doors and which would otherwise flow down the hatch. If the water is confined on the main deck until the doors can be closed

it may save the ship. On many occasions water has come through the door, poured over the edge of the hatch opening and ruined the electric work and motors so the ship was lost.

The proper way to build the engine hatch is to surround it with a solid bulkhead extending from the main deck up to the boat deck. A door with an 8″ sill above the deck would give access to the lower engine room and the companionway hatch would be dispensed with. Here again adequate ventilation must be provided.

No. 13 Binboards

Binboards to be fitted athwartships and fore and aft on deck so fish can be stowed and prevented from sliding.

In one case that presented itself, all of the calculations showed that the vessel should not have had trouble. However, it developed that the binboards were missing and when the vessel took a slight lurch the fish flowed to the low side. She still did not overturn but she did take a list sufficient to submerge the bottom of the wing athwartship door on the low side. The water went below and put all the motors out of commission.

No. 14 Bilge Pumps

At least two pumps to be connected to the bilge. The sizes given are for two pumps but two or more pumps of equivalent capacity will be satisfactory.

Boats under 70 feet long over all—Two 2″ pumps or equivalent capacity.

Boats 70 to 100 feet over all—one 2″ and one 3″ pump or equivalent capacity.

Boats 100 to 125 feet over all—Two 3″ pumps or equivalent capacity.

Boats 125 feet long over all and over—One 2″ and two 3″ pumps or equivalent capacity.

The bilge pumps have been a problem all through the fishing fleet. Only recently a vessel met with a fortuitous accident and after a lengthy sojourn in the shipyard undergoing repairs she was provisioned for sea and was at the oil dock taking aboard the final fuel, gasoline, lubricating oil and water. When the crew appeared in the morning she sat down on the bottom of the bay like a

(Continued on Page 102)

(Continued from Page 101)

tired hen. The priming arrangements had not been properly worked out and had sunk the vessel.

To get the capacity in a small space centrifugal pumps are required and centrifugal pumps have to be primed or they will not start. Lately there has been a ¾" connection installed from the sea valve to the bilge pump to prime it. This is a dangerous practice and has been a source of considerable expense to the underwriters. A check valve is placed in the bilge suction to prevent sea water from flowing from the sea into the bilge and the bilge pump prime line has a continuous flow to restart the intermittent suction of the pump.

Where a centrifugal pump with a horizontal shaft is used for the bilge service, there is difficulty in getting it started. To overcome the starting problem the pump is left running all the time. Where a centrifugal pump is left running continuously with a small amount of water in it the pump heats up to the point where the water will boil. To overcome the heating problem the connection from the sea to the pump was installed—all of which is wrong in principle.

Several flooding losses have occurred because of the failure of the check valves to work and they are totally unreliable due to chips and other dirt in the bilge. The writer fitted a bronze foot valve with a swing check valve ahead of it in several boats but even the double valve arrangement failed on occasion.

Lambie, Newby and the writer discussed the problem at considerable length in 1937. The question of the size of the boat—the space available—and the cost enter into the picture.

The original intention was to restrict the duty of the bilge pumps solely to that of pumping the bilge but where the owners are required to install two pumps they feel that either one or both should be used for more than one purpose and it is this multiple use that has caused all the trouble.

Where a pump is used for fire and bilge there must be a connection to the bilge and also a connection to the sea and if both shut-off valves are defective, as usually happens in time, there is bound to be a leak of sea water into the bilge.

The remedy for this installation is to fit what is known as a brass three-way cock close to the suction of the pump. The cock is turned either open to the bilge suction or open to the sea suction but cannot be turned open to both at the same time. It is easily taken care of as the stop valves on the sea and bilge suction can be closed and the three-way cock dismantled.

What should be done is to fit a 2" vertical spindle pump down in a sump in the shaft alley connected to a motor above so when the motor is started the pump will automatically prime itself as it will be under water in the sump. There are many devices on the market that will start the pump when a predetermined amount of water accumulates in the sump so the pump will not have to operate all the time. The usual overboard discharge is led from the discharge side of the pump.

A pipe connection is taken from the discharge line of the submerged sump pump to the suction of the second pump as two pumps are required in all cases and an additional or third bilge pump is required on the larger boats. By this means we have a fool-proof arrangement as No. 1 pump is permanently submerged, self priming, self starting, and should be bronze. No. 2 pump is primed by No. 1 pump—all of the water used by both pumps comes from the inside of the boat—and there is no connection to the sea.

If the owner wants one of the pumps to have a sea connection so the pump can be used for fire purposes, the three-way valve prevents the sea suction connection from being used for priming purposes when it is desired to pump the bilge with No. 2 pump. Care must be taken not to put the priming connection from No. 1 pump so it enters between the three-way valve and pump No. 2 or the water will run from the sea through the three-way valve back through No. 1 pump into the ship when the connections are open. In this way there is no harm done if the check valves are out of order, as they usually are.

Pacific Pumping Company specializes in building and installing vertical spindle non-clog, self-priming pumps suitable for this service and the pumps will run continuously or intermittantly wet or dry. The only change from the use of a standard pump is that the lubrication must be oil instead of grease.

Any pump that is connected to the bilge or to the bilge and sea combined should be a vertical spindle pump. As a matter of fact some of the early boats that had the pumping arrangements engineered were fitted with vertical spindle pumps for all uses except the 5" brine transfer pump which is now omitted on some of the recent boats.

No. 15 Fuel Oil Pumps

A transfer pump to move fuel oil from any one tank to any other tank to be connected to a suitable manifold on each side of the pump. The pump preferably should be about 2" and must be a non-return flow type so fuel cannot flow through the pump from the high side to the low side when the vessel has a list.

It is common practice to carry fuel in any of the wells or tanks where an excess amount of fuel is required to take the vessel to a distant fishing ground. Especially is this true when the vessel is making the first voyage where the requirements are not known to the master.

On several occasions the vessels have had trouble where there has been a cross connection between a well on one side and a corresponding well on the other side. Usually there is a tee in the center of the cross connection with a pipe from the tee to the pump. When the cross connection is left open under the supposition that the pump will draw equally from each of the port and starboard tanks, the fuel is free to run to the low side.

After the vessel has acquired a list there is no way to balance the tanks by pumping fuel from the low side to the high side. The rule provides that a pipe from each well shall be led to the manifold at the pump so fuel can be pumped from one side tank through the manifold to the other side tank.

No. 16 Bait Well and Brine Pumps

A transfer pump to be connected between the bait wells in the hold and between the brine tanks in the brine boats to enable the brine to be transferred from tank to tank.

(Please turn to Page 104)

CLIPPER TUNA

(Continued from Page 102)

The practice on this system has changed several times. Originally there was a pumping system that moved the brine from any selected tank to the manifold on the pump, usually in the engine room and thence back to any other tank. Then a tank was introduced to mix salt with the sea water and cool it for make-up brine and the piping was changed to service the brine strengthening tank.

Later the individual circulating pumps were connected to a common salt water header and the salt was added to each well simplifying the piping. Some of the brine that has been used to cool a well of fish is pumped from the header to a fresh well to help with the cooling process.

No. 17 Fresh Water Transfer

There must be no free connection between fresh water tanks. Where tanks are cross connected a check valve must be installed in the cross connection to prevent flow from one tank into another.

The trouble arose in this case from having a cross connection between the water tanks with a tee in the center from which a pipe was led to the pump. Everyone aboard was busy with catching and stowing fish and with the fishermen over the side in the racks the vessel took a list from the water running to the low side. There was no way to get it back to restore the proper balance of the vessel.

No. 18 Propeller Shafts

Propeller shafts to be carefully calculated as to size, of forged steel, monel or bronze instead of cold rolled steel.

The tuna vessels change shape quite a little due to the loading at sea and later discharging upon arival. This was carefully worked out in the June 1940 issue of the Pacific Marine Review. There were so many broken propeller shafts that for a while many of the boats were fitted with Monel propeller shafts as the Monel seemed to be capable of running out of line safely.

No. 19 Sea Chests

Cast iron and threaded nipple sea chests serving the pumps will not be acceptable. Either a bronze sleeve through the hull or a lead sleeve with a bronze connection on the inside to be fitted on the wood boats, and on the steel boats the sea chest to be built as part of the hull.

This was only an attempt to bring the boats up to good standard practice. The derelictions arose out of a lack of knowledge on the part of the builder.

No. 20 Ventilation

A 2000 cubic feet per minute inlet and 2500 cubic feet per minute exhaust blower to be fitted to ventilate the engine room. Where the engine is fitted with a supercharger the exhaust blower may be omitted. Foregoing recommendation not mandatory if surveyor decides sufficient ventilation obtainable by alternative method.

The ventilation requirement arose out of the demand by the men that the wing athwartship doors be left open for ventilation thereby endangering the safety of the vessel. Also the engineers complained that foul air in the engine room caused them to fall asleep. The owners objected at first to spending the money but there is seldom any question now about the suitability of proper ventilation.

No. 21 Fish Racks

The fish racks to rest down solid on top of the guard. The bulwarks to be cut off at the proper height to be comfortable for the fishermen from the fore end of the bait boxes to the stern.

This rule arose out of a near disaster to one of the steel boats. There never was any restriction of the kind placed on the large wood vessels but one of the steel vessels had an excessively high bulwark. To enable the men to toss the fish over the rail, the fish racks had been mounted about 10″ to 12″ above the guard. To get the fishermen down close to the water as possible for fishing purposes they had so filled the tanks that the deck was 10″ under water.

Needless to say with that much water on deck aft there was considerable loss of buoyancy and stability due to free surface. As the fishermen were thoroughly frightened at the way the vessel acted there was no opposition to making the correction and the rule is to serve as a warning that there is a potential disaster present.

No. 22 Fire Extinguishers

The size, type, loading and inspection of the fire extinguishers to be reported.

This rule came about on account of a small fire. When the crew attempted to use the fire extinguishers it was found that they had not been recharged for several years. Their presence had been reported but nobody had thought to test them to see if they were still active.

No. 23 Bait Boxes

The bait boxes must be so constructed that each bait box can be emptied in not more than 5 minutes in any condition of trim.

This rule arose out of the loss of one of the steel vessels. When the sister ship was being investigated it was found the time required to empty each bait box was in the neighborhood of 14 to 16 minutes. As the crew of the lost ship reported that she sank in 6 minutes and that they could not release the water in the bait boxes it was found necessary to change the overflow arrangement to empty the bait boxes in a reasonable time.

No. 24 Instructions to Master

The Instructions to Master prepared by the Naval Architect must be posted in the Pilot House, and Galley.

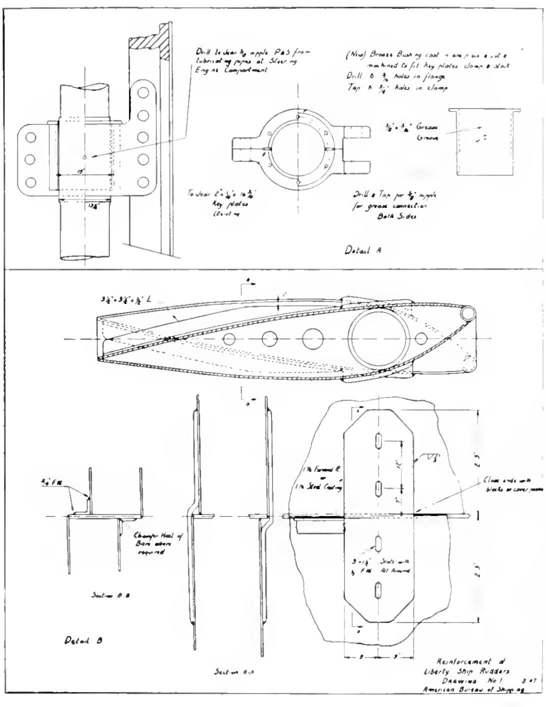
The naval architect who makes the stability inclinations is able to see which tank it is proper to fill to trim the vessel and which ones must be left empty at the start so as not to overload her. This information is incorporated is a sheet of Instructions to Master so any skipper can come aboard and know where potential danger lies.

SOLUTIONS TO LIBERTY SHIP FAULTS

The technical experts of the American Bureau of Shipping have been making elaborate tests of liberty ship structure in order to eliminate certain mechanical failures which have bothered the industry during and since the war. Some of these failures have been very serious indeed.

In several recent issues of the Pacific Marine Review there have been articles on the cracking of decks and sides of welded vessels and it would appear that the causes and solution of this trouble have been discovered.

It also appears that there have been many rudder and propeller shaft failures. In his annual report to the membership of the American Bureau of Shipping, President J. Lewis Luckenbach describes the mishaps and the action taken by the Bureau to prevent their repetition. The rate of incidence of serious failures in these vessels has been reduced from 4.1% to less than 0.5% of ships in service through reinforcing or replacing the rudders and the determination of a safe propeller speed for the protection of the propeller shaft.



A first result of the reports of failures of the rudders was the immediate halting of the manufacture of spare or replacement rudders until new units could be developed, and the Bureau also instructed surveyors, owners and operators in the examination, repair and reinforcement of the old type rudder still in service. Out of approximately 1700 vessels operating and in class with the Bureau, about 500 have had either the improved design rudder installed or the original rudders reinforced, and there have been no subsequent reports of failures in such instances. Shipyards are still replacing or reinforcing rudders at the rate of 20 to 35 per week. The illustrations on pages 106 and 108 show methods of reinforcement suggested by the Bureau.

Proper Shaft Failures

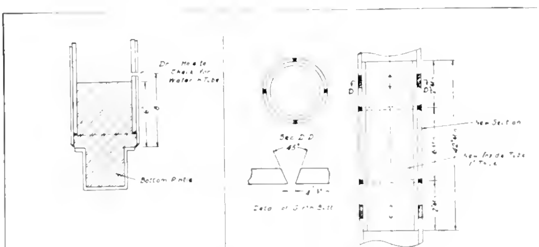
The solving of the problem of liberty ship propeller shaft failures has progressed to the point where specific recommendations or corrections are about to be announced.

Liberty ships were in operation from the first delivery in 1941 to the end of 1945 before the percentage of propeller shaft failures began to exceed the averages for other types of ships.

The failures fell into two distinct categories. One type was due to cor-

American Bureau officials at a recent Propeller Club meeting at Los Angeles. Left to right: Rear Admiral Albert Ware Marshall, USN, Retired, Honorary Member of the Propeller Club; Harry Summers, principal surveyor at Los Angeles-Long Beach Harbor; Ralph Chandler, vice president, Matson Navigation Company; Wililam B. Warren, principal surveyor on Pacific Coast, American Bureau of Shipping; and J. Lewis Luckenbach, president, American Bureau of Shipping.

rosion fatigue and was indicated by a circumferential groove around the shaft at the end of the liner. This type was caused by a defective seal at the propeller and the records for 1947 indicate that failures from this cause have been practically eliminated. The other type of failure took the form of a fine hair line crack starting from the forward end of the keyway on the driving side. A torsional vibration analysis of the propulsion system was made by the Staff and the General Electric Company was retained by the Bureau to carry out torsiograph tests aboard the Liberty ship *Ira Nelson Morris,* and they verified the staff's findings. The tests showed that there is a third order critical speed in the normal operating range of about 4500 pounds per square inch. This vibratory stress is sufficiently high to cause the type of failure noted, but only after the shafting has been run at or near the peak for a considerable length of time.



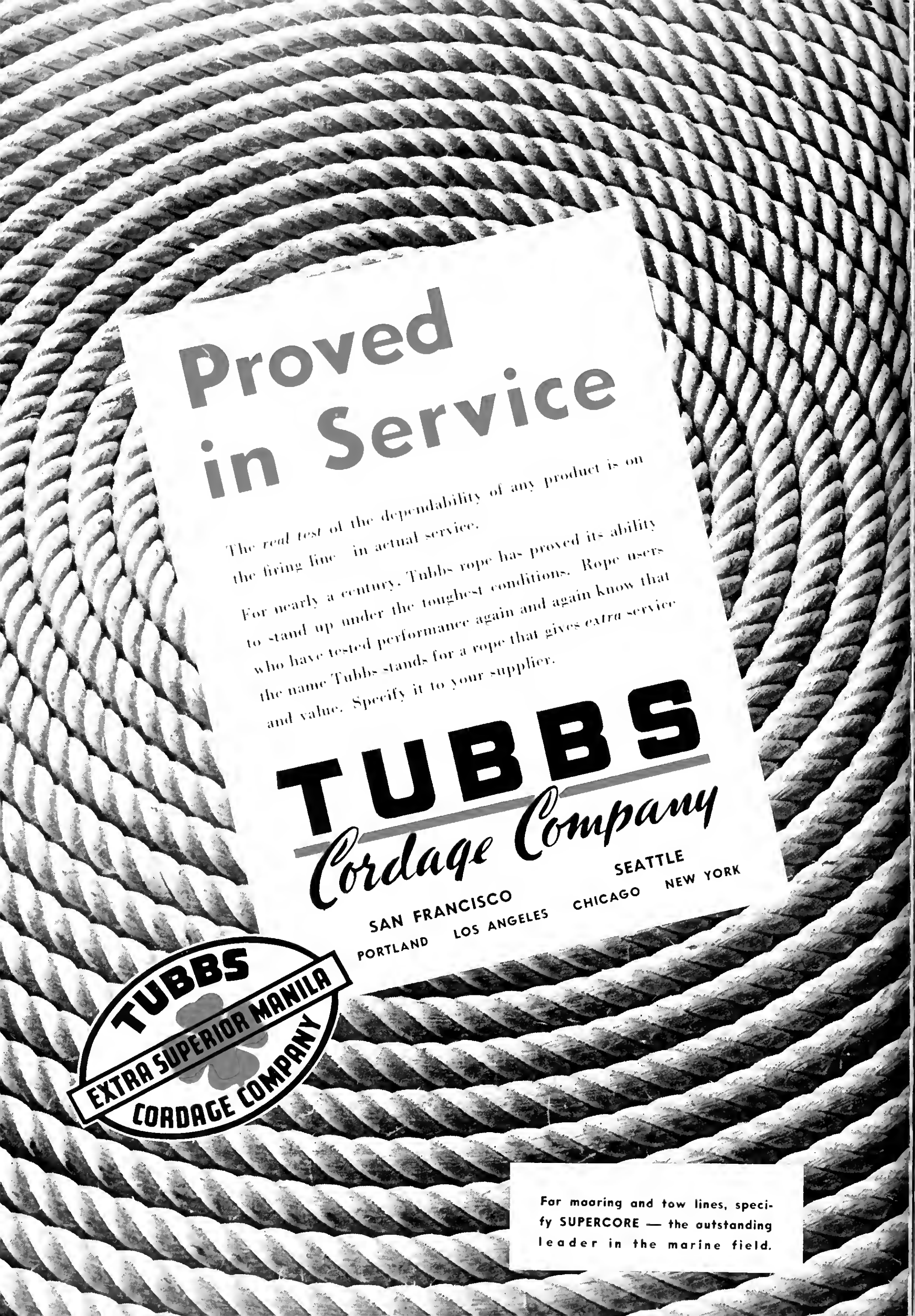
The tests indicate that the peak occurs at about 78 RPM when the vessels are completely light and at about 74 RPM when they are fully loaded.

The third order critical speed should be at least 10% to 15% above the maximum operating speed, depending mainly on the type of governing employed to control the speed regulation. This would indicate that the engines should be operated between 63 and 66 RPM when loaded and between 66 and 70 RPM when completely light.

Pending a complete analysis, the Bureau recommends that the engine speed on these vessels should not be allowed to exceed 66 RPM and that means for governing should be provided so that this speed will not be exceeded.

Pacific MARINE REVIEW

MARCH 1948


Proved in Service
The *real test* of the dependability of any product is on the firing line — in actual service.
For nearly a century, Tubbs rope has proved its ability to stand up under the toughest conditions. Rope users who have tested performance again and again know that the name Tubbs stands for a rope that gives *extra* service and value. Specify it to your supplier.
TUBBS
Cordage Company
SAN FRANCISCO SEATTLE
PORTLAND LOS ANGELES CHICAGO NEW YORK
TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY
For mooring and tow lines, specify SUPERCORE — the outstanding leader in the marine field.

Pacific MARINE REVIEW

. S. HINES
Publisher

. N. DeROCHIE
Assistant Publisher

. DOUGLAS MacMULLEN
Editor

. N. DeROCHIE, Jr.
Assistant Manager

AUL FAULKNER
Pacific Coast Advertising Mgr. Los Angeles Office

AVID J. DeROCHIE
Assistant Los Angeles

EORGE W. FREIBERGER
Advertising Mgr. San Francisco

LOS ANGELES OFFICE
16 West 5th Street, Zone 13
Telephone—MIchigan 3129

SAN FRANCISCO
Telephone—GArfield 1-4760

MEMBER AUDIT BUREAU OF CIRCULATIONS

ubscription rates:

ne year, $2.00; two years, .50; three years, $5.00; forgn, $1.00 additional per year; ngle copies, 25c.

TABLE OF CONTENTS - - - - MARCH, 1948

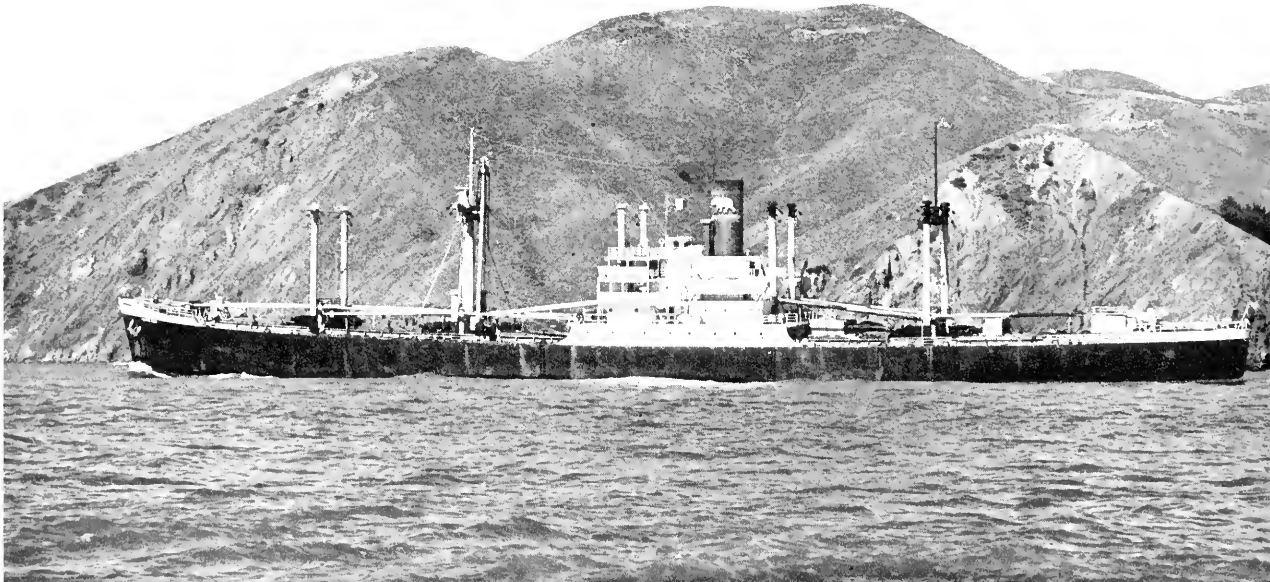
PUBLISHED AT 500 SANSOME STREET • SAN FRANCISCO 11, CALIFORNIA

Noah

ONE SARDONIC DEFINITION OF GRATITUDE is "the hope of favors yet to come." It might not be amiss to apply some gratiude of this type to the shipping industry and to the armed services. The "favors yet to come" may be just around the corner! The journey of the Freedom Train but emphasizes a seeming unwillingness to anticipate a crisis. Perhaps existence is too smug, and we forget that tomorrow's tyrants come from those who today are too poor or too rich or too fat. This applies to nations as well as to individuals. Tyranny can be short-lived, but the destruction it brings may be thus wrought the sooner. Noise and commotion in the world may be a sign of calculated trouble ahead. To those who protect our heritage of freedom we suggest the need for "gratitude." For shipping, a sound plan is to determine every possible requirement *and build it*—not wait for emergency. Lay up the ships if necessary, but *build* them!

After 4800 years Noah is still newsworthy. He was no procrastinator. It wasn't raining when he built his ship. He knew that the time to prepare for rain is when the sun is shining brightest. And he got full cooperation from those who were to be protected. Those who would build ships today get something less than full cooperation.

The American people and the government and the shipping industry should unite in defensive plans, and shipping people should make their collective voice heard for preparation. They should not scatter their shot, but work together, for they seem to find it harder to work and live together than for their sons to die together!



P. F. E. L.'S

PACIFIC BEAR

CLEARING THE GOLDEN GATE
AND DOWN TO THE MARK FOR THE ORIENT.

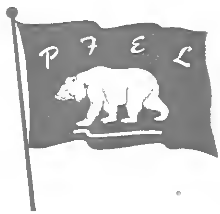
Pacific Far East Line

PACIFIC FAR EAST LINE, INC., put its first ship on berth in July 1946. Today, less than two years later, it is one of the largest operators of commercial tonnage on the Pacific Coast, maintaining nine sailings monthly on six separate regular services between California ports and the Orient. It operates in all 35 large freighters, including nine fully refrigerated vessels, and seven C2 full scantling type dry cargo freighters, five of which it has purchased from the Government as the nucleus of its future fleet.

Thomas E. Cuffe, President

Pacific Far East Line services are:

1. A sailing every second Friday from California ports to Manila, Iloilo, Cebu, and other Philippine outports as inducements offer;
2. A sailing every second Friday from California ports to the major ports of Japan, China, North China, Korea, and French Indo-China. The above two services alternate to provide a sailing every Friday from California.
3. A monthly service between California ports, Taku Bar, Inchon (Jinsen), Korea;
4. A monthly dry-cargo service to Guam, sailing the 15th of each month;
5. A refrigerator service every 10 to 11 days between California ports, Manila, Hong Kong and Okinawa.
6. A refrigerator service every 9 to 10 days between California ports and Japan.



The Line is also agent for the North Pacific Steamship Company, Ltd., a Canadian organization which maintains a monthly easterly round-the-world service from Canada, terminating at Los Angeles.

In addition, the Line is a sub-contractor for the movement of pipe line to the Middle East in connection with the Arabian American Oil Company's development there.

To maintain these extensive operations, Pacific Far East Line uses seven C2 full scantling type dry cargo freighters, thirteen Victorys, nine fully refrigerated vessels and six Libertys.

Although postwar conditions have necessitated the use of other types of tonnage, the C2 steamer will be the Line's standard cargo carrier. The C2 was considered as the most efficient hull, carrying more space through water for the least operating cost. Her selection was the result of consultation between the combined heads of traffic, operating, stevedoring departments, the marine superintendent, and port captain. The five company-owned vessels include the *Pacific Bear, Indian Bear, California Bear, China Bear* and the *Philippine Bear.* Of the different types of C2's the Line chose the C2-SAJ-1, known as the full scantling type. This is the standard C2 vessel with certain internal structural strengthening, giving it more deadweight lifting capacity. The ship represents a combination of speed, capacity, and economical operating cost. It should be able to hold its own against increasingly tougher foreign competition. The vessel is propelled by General Electric 6600 shaft horsepower turbines with reduction gears. Boilers are of different makes. The *Pacific Bear* has a Combustion Engineering Corp. boiler. Foster-Wheeler boilers are used in the *Indian Bear*

and *California Bear*, and Babcock & Wilcox boilers in the *China Bear* and *Philippine Bear*.

All have a capacity of about 10,610 deadweight tons with an approximate speed of 16 knots. They have gyro compasses and are equipped, or in process of being equipped, with radar, loran and radio phones. They were built by the North Carolina Shipbuilding Company, of Wilmington, North Carolina.

The five company-owned vessels cost close to $10 million. The other two C2's in operation are under private time charter.

The nine fully refrigerated vessels, which are under U. S. Maritime Commission bareboat fleet charter, are of two types. Six are steamer and three are diesel.

The steamer reefers have General Electric turbines with reduction gears. Three of the six have Foster Wheeler boilers and three have Babcock boilers. Built by Moore Dry Dock Company of San Francisco and Oakland, they have 320,000 cubic feet of reefer capacity or 6960 to 7573 deadweight tons. They have a speed of 16 knots approximately.

The three diesel reefers were built by the Sun Shipbuilding Corp. of Chester, Pa. They have Sun-Doxford, 5-cylinder diesel engines with Foster-Wheeler auxiliary boilers. Their speed is approximately 16½ knots. They have 320,000 cubic feet of reefer capacity, or 8595 deadweight tons.

The thirteen Victorys in use are of two types: Eight are AP3's of 8500 horsepower, producing a speed of 17 knots approximately. Five are AP2's of 6500 horsepower and approximate speed of 15 knots. Both types of tonnage have a cargo capacity of between 10,680 and 10,825 deadweight tons. All are turbine driven with high pressure boilers. These ships are under U. S. Maritime Commission bareboat fleet charter.

The five Libertys also are under U. S. Maritime Commission bareboat fleer charter. They are the regular EC2 types with reciprocating engines mostly built by Joshua Hendy Company.

The Line has under private time charter a special Liberty type. This is the Z-EC2-SC5, which was con-

Pacific Far East's INDIAN BEAR at her dock in San Francisco with another PFE vessel astern. Picture shows a striking array of cargo booms in action.

verted during the war to facilitate the movement of tanks and planes. The usual five hatches have been reduced to four and made larger. Also there is unusually high head room in the holds. The vessel described is the *Lorenzo G. McCarthy.*

The executives who are responsible for the record development of Pacific Far East Line are nationally known in the steamship industry.

Top man in the organization is President Thomas E. Cuffe, one of the small group of planners who organized the company. Cuffe resigned as vice president of American President Lines, in charge of U. S. A. Eastern Territory, to start Pacific Far East Line. He has been in transpacific shipping during all his business career, starting as a shipping clerk 30 years ago.

Vice President and General Manager is John R. Wagner, whose entire career has likewise been spent in Pacific shipping.

E. V. Nevin, Secretary-Treasurer, formerly held a similar post with American Export Lines of New York.

T. S. Lowry is Vice President in Charge of Operations. Lowry, who recently resigned as Chief of the Water Division, Army Transportation Corps, Washington, had a brilliant war career as port commander in Hull, Naples, and Marseille, and later in the Philippines with the Sixth Army. He started his steamship career with the old U. S. Shipping Board, later going with Isbrandtsen-Moeller Steamship Company.

A. L. Papworth, vice president in charge of sales, is a nationally known sales executive, resigning last year as national sales manager of Moore, Ltd., to become associated with Pacific Far East Line.

L. G. Dunn, recently appointed Freight Traffic Manager, is an authority on traffic problems and rates, and thoroughly experienced in cargo handling and freighter operations. He has been in shipping since 1931.

Other executives of note are: Hubert Brown, Assistant to President; R. J. Pries, Assistant to Freight Traffic Manager; V. J. Bahorich, Superintending Engineer; W. T. Lion, Port Captain; H. A. Steiner, Port Engineer; J. J. Presser, Purchasing Agent; T. D. Hardcastle, Port Purser; W. C. Juergens, Claims Agent; F. L. Dwinnell. Industrial Relations Counsel.

The Line's special Chinese Department is headed by two well known Chinese shipping men. These are T. Y. Tang, who is advisor on Chinese affairs, and Frank W. Chinn, Chinese General Agent in San Francisco.

Another factor in Pacific Far East Line's success is the financial and business caliber of the company's board of directors. These are S. D. Bechtel, president of W. S. Bechtel Company; Alden G. Roach, president of Consolidated Steel Corporation, Los Angeles; Joseph Di Giorgio, president of the Di Giorgio Fruit Corp.; Richard Wagner and Howard J. Klossner, president and vice president respectively of The Chicago Corporation, leading Middlewest investment house; John A. McCone, president of Joshua Hendy Iron Works of Los Angeles. T. E. Cuffe, president, is also a director.

Executive headquarters of the Line is at 141 Battery Street, San Francisco, with the Freight and Passenger departments at 315 California Street. The latter are located on the ground floor for the convenience of shippers. Although primarily a freight service line, many of the company vessels have modern, comfortable passenger accommodations for from 10 to 12 persons. Passenger accommodations are usually booked many months ahead mostly by business men with interests in the Orient.

Outside of its executive headquarters, Pacific Far East Line has branch offices in Los Angeles, Chicago, New York and Washington. It has agents at Seattle, Portland, Detroit and Cleveland. Overseas it has offices at Manila, Shanghai, Hong Kong and Yokohama; and agents in the following: Balboa, Canal Zone; Bahrein, Persian Gulf; Bangkok, Siam; Calcutta, India; Cebu, P. I.; Chinwangtoa, China; Colombo, Ceylon; Cristobal, Canal Zone; Davao, P. I.; Guam, M. I.; Honolulu, T. H.; Hulutao, China; Iloilo, P. I.; Keelung, Taiwan; Kobe, Japan; Panama, R. P.; Saigon, Fr. Indo-China; Takao, Taiwan; Taku Bar, China; Tientsin, China; Tsingtao, China; Vancouver, B. C.

It is also represented in the major ports of Japan and has agency presentation in the principal ports of the world.

The Line has won the reputation in the shipping in-

Left, W. T. Lion, Port Captain

Right, H. A. Steiner, Port Engineer

dustry of bringing a modern point of view to steamship transport. While officials hold fast to precedures whose efficiency has been developed and proved by experience, they welcome all new ideas that may improve cargo handling methods, packaging, stowage, freight solicitation, documentation and personnel relations on shore and ship. There are few steamship lines with higher staff morale.

Among modern methods adopted is creation of a special Sales Department. The Line felt that traffic officials should devote all their attention to procuring space, while a specialist should take over the task of solicitation. This will assure the shipper of well-rounded service and at the same time coordinate field activities with all parts of the business, resulting in better, more friendly service. The traffic men, meanwhile, can give more time to improving the mechanics of traffic operations. Some improvements already have been put into effect. The freight document section has been expressly placed on the ground floor, readily available to the public so that documents can be cleared without loss of time.

The Line also has adopted snap-out bills of lading and export declaration forms. Among loading improvements adopted is the establishment of a tail-gate delivery at dockside in San Francisco so that trucks can load and unload directly from the receiving platform.

The Line also has given considerable attention to industrial relations—shipside and shoreside. A special department had been set up to this end under an experienced director, Frank L. Dwinnell.

Of ancedotal interest is the fact that a Pacific Far East Line vessel last year moved the first civilian shipment from Japan to California, following the opening of that country to free trade August 1947.

Below, officers of Pacific Far East Line. Top, left to right: John Wagner, Vice President and General Manager; T. S. Lowry, Vice President; A. L. Papworth, Vice President. Bottom, left to right: Edward V. Nevin, Secretary-Treasurer; L. G. Dunn, Freight Traffic Manager; Hubert Brown, Assistant to President.






Bethlehem Reconditions a 108-Ton Crankshaft

By PETER MacDONALD
Foreman, Machine Shop, Bethlehem Steel Company
Shipbuilding Division, San Francisco Yard

COMPLETELY REASSEMBLING a 6,000 HP diesel engine which had been stripped to the bed plates . . .

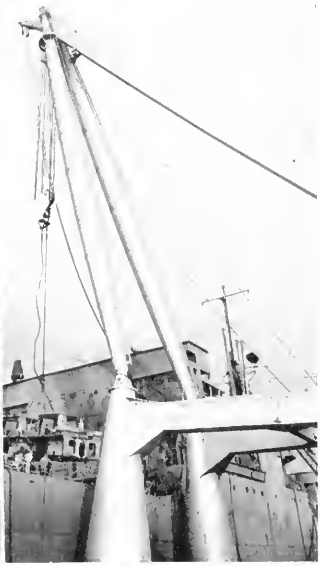
Reconditioning a 108-ton crankshaft whose stub end and pins had shown signs of loosening . . .

This job, which was successfully completed recently by the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division, is said to be the first of its type ever to be performed in a West Coast shipyard. The vessel involved was the Navy Supply Ship KA8, now known as the MV Algorab, which was recently purchased by foreign interest, and which was operated by the Navy in the Pacific during the war.

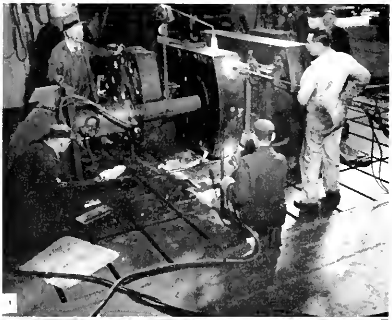
When she came to Bethelem's San Francisco Yard in September, 1947, her Sun Doxford diesel engine had been stripped to the bedplates and the parts stored in the vessel's cargo holds. These were taken out of the ship and removed to one of the yard's warehouses where they were inspected and their identification checked before being reassembled. Before this was done the cylinders and guides were relined, as well as the thrust and line shafts. The engine bed was checked and the holding down bolts inspected and renewed where ncessary.

Peter MacDonald

Upon inspection, stub ends and pins on the four section crankshaft showed signs of loosening. It was decided, therefore, to remove the entire shaft from the ship. This



At left is the Algorab on drydock and right, cylinder housing being removed from the Algorab by sheerlegs crane.



was taken out, section by section, and dismantled in the machine shop by pressing the stub end and pins from the webs.

Pins and stub ends were then built up by means of welding. This was done with a mechanical welding machine and then remachined to fit the webs which had previously been rebored in the yard's machine shop. Webs were then heated to a temperature between 600

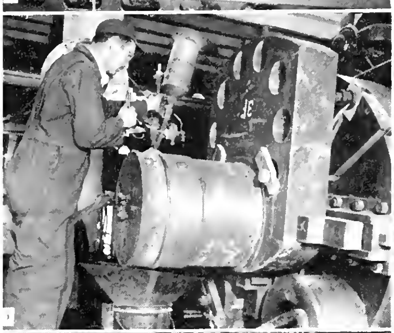
(Please turn to page 46)

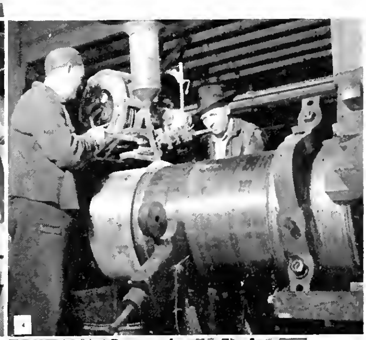
1. Pressing out crank pin with hydraulic ram. Web is being heated as pressure is applied to pin

2. George Vogensen, machinist, finishing boring crank web for crank pin on 6" horizontal boring mill.

3. Welding stub end of crank shaft section where it fits into crank web. Stub end is clamped in lathe chuck and revolves while stub end is welded with mechanical welding machine. B. A. Brookman is operating welding machine.

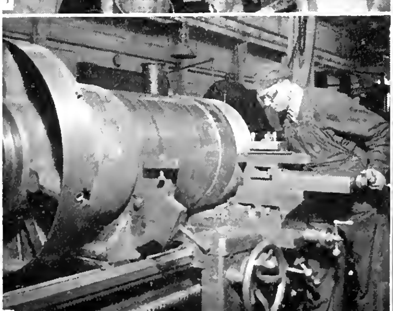
4. Welding crank pin using same method as stub end. Henry Smith and McKinley Doda are operating welding machine.

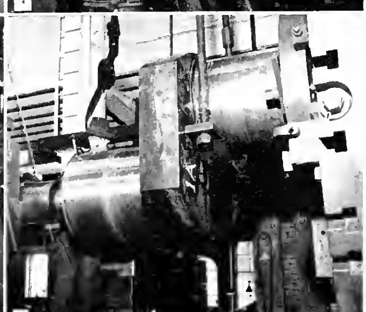




5. Gus Molin, machinist, machining crank pin to size, after welding, for shrink fit into web.

6. Alec Weber, machinist, inspects stub end which has now been machined down to designated diameter for shrink fit into web.

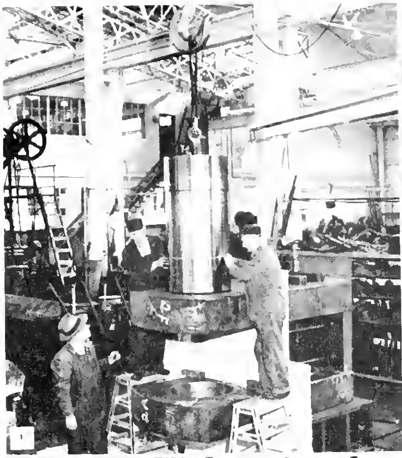


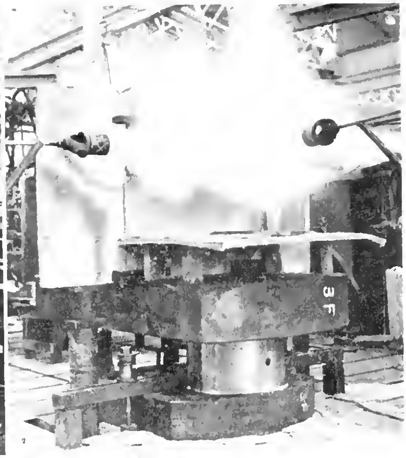


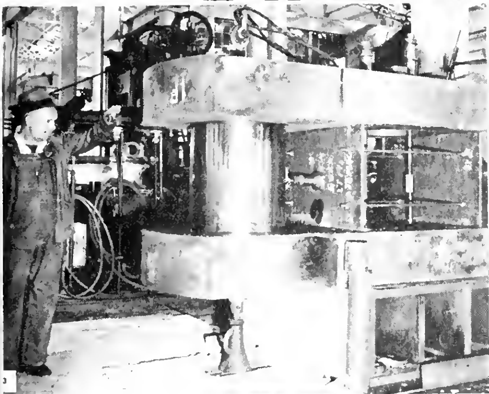
1. Arthur Tamberg, E. Partels and Don Sheridan conduct first shrinking operation. Pin is being shrunk into web section which has been expanded by heating.

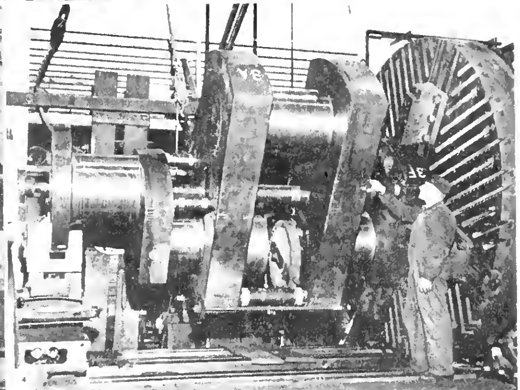
2. Heating web with gas torches prior to shrinking in stub end.

3. Crank pin shrunk in place. Arthur Tamberg is inspecting the completed job.





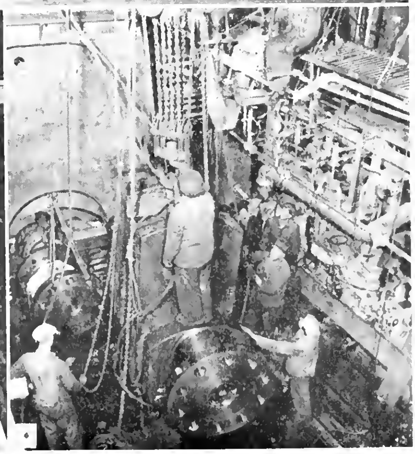




4. Adolph Erickson, machinist, checking completed crank in lathe for trueness.

5. Adolph Erickson and Cliff Erickson, night supervisor, inspect crank which has been completely assembled after final shrink.

6. Section of crankshaft being lowered into place on ship.



Crankshaft in place on Algorab

(Continued from page 44)

and 700° F. before the pins and stub ends were shrunk in place. All shrinking was done in a vertical position to eliminate any distortion.

Following the shrinking operation each crank section was checked in the lathe for trueness. Main journals were remachined and cranks were lined up and new coupling bolts fitted.

The reconditioned crankshaft was then reinstalled in the Algorab section by section.

West Coast Waterfront Payrolls at New High— But Foreign Lines Are Getting the Cargoes

West Coast waterfront payrolls jumped to over $57 million dollars in 1947, a 17 million dollar increase over 1946. The situation in seafaring employment on the Coast was different, with a 10% reduction occurring during 1947.

This information and other factors in West Coast Maritime employment were contained in a joint report released by the Waterfront Employers Association of the Pacific Coast and the Pacific American Shipowners Association.

The 40% increase in longshore payrolls compared closely with the 50% total cargo increase in 1947 for all West Coast ports, recently reported by the industry. The difference is accounted for by the preponderance of lumber and wheat cargoes contained in the 1947 increase, which require a minimum of longshore work.

Individual port longshore payroll totals in 1947 were:

	1946	1947
San Francisco	$18,146,321	$27,550,000
Los Angeles	8,411,368	13,623,000
Portland	5,673,542	7,952,288
Seattle	8,451,879	7,944,282
	$40,683,110	$57,069,570

Of the $27.5 million in San Francisco, $23.3 million was earned by a total of 5,712 "regular registered" longshoremen. Average annual earnings for these Bay Area longshoremen was $4,084. Average earnings of U. S. factory workers was $2,566. Those for U. S. Civil Service workers were $2,856.

On the seafaring side, average monthly employment for the American lines on the coast stood at 18,668 for the quarter ending December, 1947. High for the year was 20,119 at the end of March. Total seafaring payrolls were not available.

West Coast shipping had less interruption of service in 1947 due to labor disturbances. The 1946 strike lasted 73 days, whereas there was no coast-wide tie-up of any duration in 1947. The 1947 foreman strike affected only a few lines in the California ports.

The Waterfront Employers Association central pay system, only one of its kind in the world, according to Kenneth F. Saysette, WEA treasurer, achieved coastwide application in 1947. Seattle installed the system in that year. Longshoremen are rotated from employer to employer by the union and have as many as four employers per pay period. The pay system bulks all earnings and deductions into one check for each man.

New Ship Structure Materials

By DAVID MacINTYRE
Head Marine Section, Development Division
Aluminum Company of America

I knew—*I* knew what was coming,
When we bid on the "Byfleet's keel—
They piddled and piffled with iron.
I'd given my orders for steel!
—Kipling

The naval architect and shipbuilder today must consider an increasing array of new materials and refinements of old, tried and proven ones in the pursuit of their craft. In some form or other, a multitude of commercial materials enter into the construction of hull, machinery, equipment or outfit of ships in great or small degree. These conditions require the close attention of those concerned with the design, building and operation of ships to new or improved materials, particularly for hull construction.

The ship has been called, and in some degree is, the artistic masterpiece of man. Great poets have eulogized the ship in more than materialistic terms. Popularly, as well as under ancient and Admiralty law, the ship has been invested with a personality. In its structure, as a residence, as a carrier of goods, as a machine in the service of man, it has developed in complexity with increasing complexity in the life of progressing man. Today, after utilizing wood, iron, steel and concrete for hulls; canvas, steam and oil for propulsion, designers, builders and operators of ships, in a move to keep pace with progress, must consider particularly and fully the qualities of light metals for structures and equipment, gas turbines and the atom for propulsion, and similar materials and technological advances to invest their vessels with a more efficient and modern personality.

Since time immemorial, boats and ships have been built of organic materials. About 1840, for example, practically all seagoing vessels were of wood construction. Thousands of years of development had brought

Fifty-five tons of aluminum were employed in the building of Alcoa Steamship Company's new Alcoa CAVALIER, placed in service early in 1947. The vessel is equipped with aluminum alloy structures above the sun deck, including houses, bridge and smokestack enclosures. Life boats, davits, boat winches, airports, bridge and promenade enclosure windows, joiner bulkheads, doors, interior decorations, handrails, hatch covers and scores of miscellaneous items have also been fabricated from aluminum.

In the all-aluminum ship shown above, hull, superstructure, lifeboats and fittings are fabricated from aluminum alloys pre-tested for resistance to salt water, corrosion, the result of years of intensive Alcoa research. The 10,000 ton carrier is 422 ft. long, extreme beam 60 ft.

about a high degree of perfection in the use of wood in shipbuilding. The pages of history from the Phoenicians to the era of the Yankee clippers tell of the voyagings of many fine wooden craft. Few such ships, however, exceeded 200 feet in length, though a few vessels attained a length of about 300 feet. To build enduring strength into larger structures was impossible. Even moderate size was in many cases impracticable because of natural limitations in timbers available, in size of pieces, non-uniformity of grade and seasoning, susceptibility to marine attack and inevitable distortion which resulted from straining and slippage while at sea. Many old wooden ships became hogbacked and their keels were frequently several feet out of line. Often these distortions occurred at launching.

Iron began to be utilized in ships as a substitute for wood hulls about 1820, following its early use in 1787 by the Carron Iron Works in the building of canal barges. Indeed, for many years it was employed in the hulls of floating craft only in this tentative, or developmental, manner. Many of those versed in wood construction scoffed at the idea of iron seagoing vessels. In time they were convinced of the practicality and strength of iron, from such accidents as stoppages during the launching of iron barges and by several groundings across rocks of some of the original iron-built Newcastle coal boats. Such experiences not only demonstrated the high strength of the material, but actually showed that scantlings then used were excessive, leading to a more accurate analysis of the structural requirements for seagoing vessels.

The 180 ton "Sirius," built in 1837, was the first iron seagoing vessel *classed* by Lloyd's. With this new material, and differences of opinion as to its use and the variety of early building practices, experience had to be accumulated to indicate with some precision the best methods of construction, together with sound structural requirements for safe and economical design. Experience was also needed to gauge iron's ability to withstand corrision under sea service conditions. Compared with the rotting of wood and attacks by marine borers, iron showed little deterioration. It thinned away some from corrosion, but allowances had already been made for this; it could be seen and corrected, and ways were devised for preventing or reducing it.

These were the natural results of the experimental nature of the material, but in due time Lloyd's and other classification societies adopted standard rules for the building and classification of iron vessels. Later, as additional and increasing experience was obtained, these societies revised them, as they have continued to do with the advent of new and improved materials.

For merchant ships, Lloyd's Register of Shipping is unique since it accurately records periods of development of new and modern ship structure materials, including particulars such as age, scantlings and excellence of construction, for the necessary purposes of classification. Lloyd's earliest publications, preceding the introduction of iron, were devoted exclusively to wooden vessels. Their symbols of classification virtually developed with wooden vessels, and the symbol "A-1" became a recognized proverb of perfection as we know and use it today. Because of the numerous kinds of timber of varying degrees of durability employed in shipbuilding, Lloyd's found it necessary, given good workmanship, to prefix the symbol of perfection with a numeral to identify the structural timber employed.

Deterioration of wooden ships is inevitable with age; timbers rot, iron bolts rust, wood treenails loosen and the structure ultimately becomes less seaworthy. Vessels built of teak, most durable of ship timbers, were expected to remain sound for sixteen years and received the classification 16A1. Fir was presumed to last for eight years and vessels so built were classed 8A1. At the end of these periods, the high classification expired, but could be reinstated in part with a lower classification if the structure was sound or was made so. In the case of iron, and later of steel vessels, the numerals 100 were prefixed to the symbol "A1" to identify those vessels built to Lloyd's highest standards of strength and workmanship.

Was this a prediction made by early underwriters and shipowners that an iron vessel would last 100 years? If so, their early thinking was apparently justified, for a few still survive, and records show they are still in active service. Compare this to the few historic wooden warships in preservation at their safe moorings!

Coincident with the development of the iron hull was the development of the steam engine for maritime purposes. Many paddle driven wooden vessels were equipped with steam engines, among them the historic and commercially successful "Clermont." The science of metallurgy developed with them, and was applied to the improvement of hulls as well as machinery. Iron, however, like wood, had its limitations. In time, naval architects and builders, dogged by fierce and sometimes vicious competition for cargoes and freight experimented with and, finally, adopted its alloy—steel.

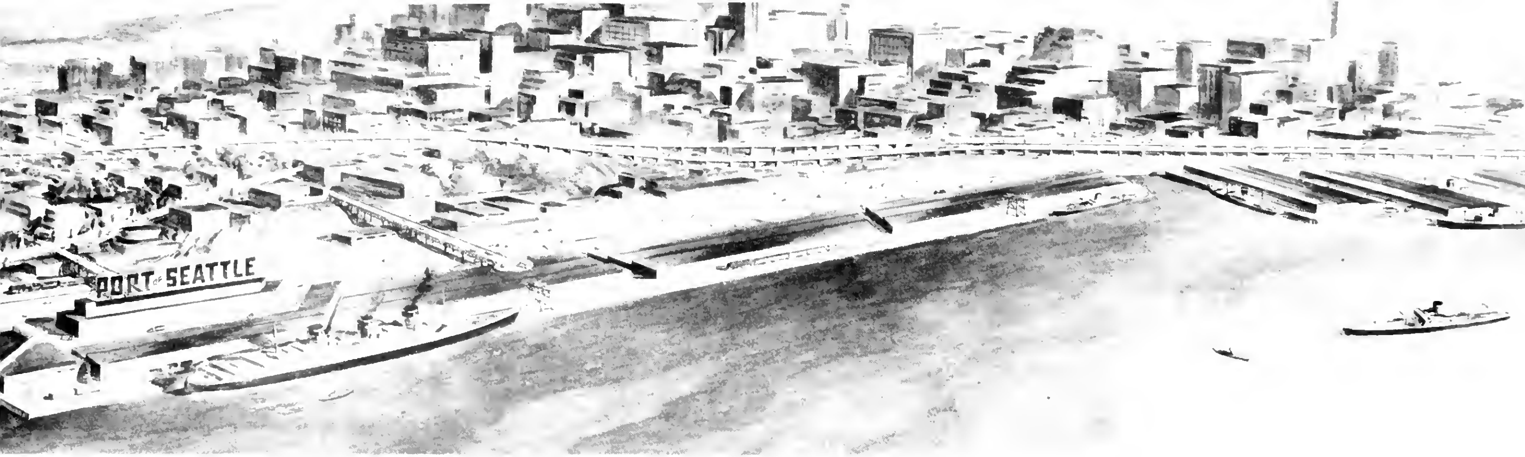
By 1855, when the behemoth iron hulled "Great Eastern" was built, the use of iron for seagoing vessels had become relatively common. In that year, Lloyd's issued its first rules for the construction of iron vessels. Puddlers of those days produced iron of excellent quality, but when experience conclusively proved the greater strength of iron vessels as compared with wood, a tendency developed to build cheaply. The result was inferior iron and the quality of many such ships deteriorated with the material. Indeed, this malpractice became so common that iron plates of inferior quality came to be known as "boat plates." Political agitation, in the wake of scientific and technological advances fortunately checked the trend, and the establishment of rigid test requirements and other controls speeded improvements in manufacture and in building.

Ordinary puddled steel was first used for ship hulls for high speed paddle steamers about 1859. This steel, while it had a tensile strength of approximately 90,000 pounds per square inch, was brittle, unreliable and expensive, costing about 10 cents (10c) a pound. Its use was confined almost exclusively to high speed steamers, the requirements of lighter hulls making strength in the structural material most important. The American Bureau of Shipping was incorporated in New York State in 1862 for the classification and survey of ships and readily assumed its place in vessel development. Bessemer steel was introduced about 1863, but because of imperfect production processes, its characteristics were not much better than puddle steel. The latter confined its use to

(Please turn to page 100)

Almost every bit of metal in the superstructure of the President Cleveland (top picture) is aluminum. Included are the smoke stacks, life boats, davits and walls.

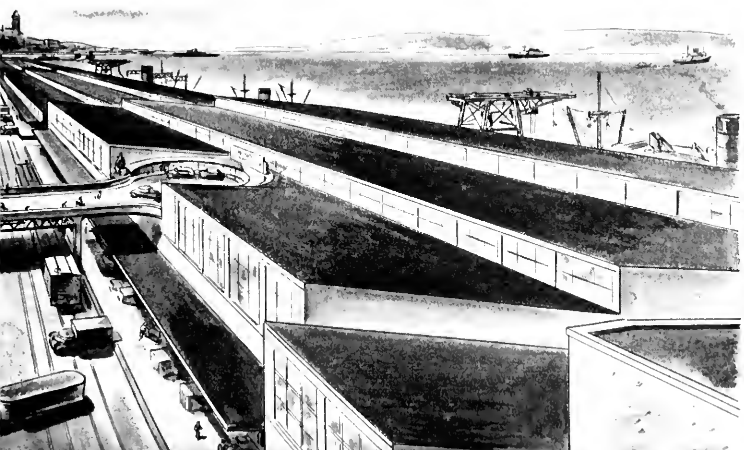
Picture at right shows one of the salons aboard the Alcoa "Cavalier," which features aluminum picture frames, furnishings, lamps, and lamp shades, doors, lighting fixtures and flashing. Greatly increasing amounts of aluminum have been utilized by ship decorators since the war for doors, promenade windows, airports, and interior decorative trim.

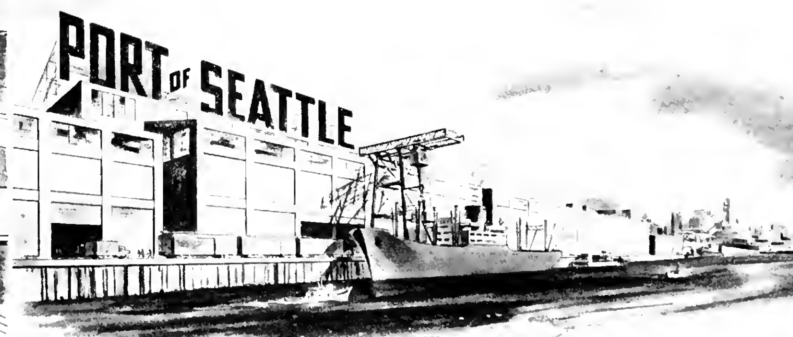


Above, in the foreground, chief feature of a comprehensive Port of Seattle plan, is an advanced quay-type parallel development stretching more than 3000 feet. In the background is the great new Alaska Way Viaduct, a $6,000,000 project financed by local, state and federal funds and due for construction start this summer.

Below, left: On the Alaska Way side of the Port of Seattle's planned quay-type parallel development, an 80-ft. depressed area is provided for trucking, with a continuous 20-ft.-wide loading platform and a continuous line of doors for through-handling of all classes of freight.

Below, right: To achieve unprecedented speed in the handling of cargo shipside, the Port of Seattle's quay-type parallel development will have a continuous, unobstructed 40-ft. wide timbered apron, providing double-track direct loading from railway cars.





Port of Seattle

By WALLACE V. MACKAY

INCREASED aggressiveness of competition for tonnage and for modernization and expansion of facilities of Pacific Coast ports, as exemplified in the records of 1947, results in common benefits to all classes of west coast shipping.

This observation was made recently by the Port of

Officers of the Port of Seattle. Top: J. A. Earley, President, and E. H. Savage, Vice-President.

Below, left to right: A. B. Terry, Commissioner; Col. W. D. Lamport, General Manager, and George T. Treadwell, Chief Engineer.

SEATTLE

Seattle Commission at their January reorganization meeting incident to an intensified operational and promotional program for 1948-49 with emphasis on Alaskan and Oriental trade by sea and by air. U. S. Government statistics were cited to show that Seattle's ratio of substantial increases in import and export tonnage and valuations in 1947 over 1946 "compared very favorably with increases recorded for other major Pacific Coast ports."

Stressing the economic importance of world trade to the healthy growth of industry, payrolls and agriculture of the State of Washington, the Port Commission called public attention to "the hurdles of legal restrictions and limitations under state law which for many years have handicapped and impeded promotion of world trade not only for Seattle but for every other port district in the State of Washington."

Only since the spring of 1947, when the Washington legislature amended the laws governing municipal port corporations, was the Port of Seattle permitted to budget funds for national advertising either through direct expenditures or through cooperative promotion with other groups, such as the Chamber of Commerce.

Now that this archaic shackle has been legally removed, the Port of Seattle was enabled to launch an effective but relatively small national advertising campaign in 1947. But Seattle and other ports of the State of Washington are still at a great competitive disadvantage in comparison with ports of such states as California, Louisiana, Texas and New York.

Ports of the State of Washington receive no support in any form from the State and must rely entirely on their own resources for developments or promotion even when such enterprises are obviously for the common benefit of all the taxpayers and interests of the State. Ports of other states, the Commission pointed out, are supported at least in part by state tax funds, directly or indirectly. Therefore, contend the Seattle shipping factors, it is "high time to correct this condition that places our ports under such an obvious competitive disadvantage, so that the costs of necessary promotion for the common good may be shared in a more equitable and businesslike way, it being already conceded and demonstrated that the ports are logical spearheads for such promotional activities for world trade and industrial expansion."

John A. Earley, senior member of the Port of Seattle Commission and representative from the North district, was elected president of the board succeeding E. H. Savage.

Savage, West Seattle civic leader and representative on the Commission from the South district, was elected vice president. He has served as president for the past two years.

A. B. Terry, newest member on the Commission, who last year was elected to succeed Commissioner Horace P. Chapman who resigned after 14 years continuous service as representative from the central (city) district, was chosen secretary.

Col. Warren D. Lamport remains as general manager and George T. Treadwell as chief engineer for the Port of Seattle.

The commission issued a statement commending Savage for "outstanding services to the Port of Seattle, especially during the past year featuring an aggressive national and foreign trade promotion program; saving the taxpayers a huge sum of interest money by retirement of $2,500,000 in bonds on the super-modern Pier 42 twin-terminal; great progress in financing and completion of the super-modern Seattle-Tacoma Airport; and great advances in speeding and improving shipping services for the Alaska trade."

Signalizing a year of "the most constructive and aggressive activity in Seattle's history in improving and economizing services and in promotion of Seattle's world port destiny against heavily increased competition and still unsettled conditions affecting Oriental trade," Earley said the port "will speed use of every practical means leading to establishment of a foreign trade zone here or elsewhere on Puget Sound with the help of State funds to expand industry and commerce for this State."

Earley, who has served on the Port Commission for the past 14 years, said that "while the Seattle import and export trade record for 1947, on the basis of U. S. Government published statistics, proves that we have more than held our own against competition and the adverse conditions that were the aftermath of war in the Pacific, the 1948 phase of our promotion and development program will doubtless result in an increasingly better record this year."

BOOK REVIEW

SHIPS AND SAILING ALBUMS, 1 to 4, published by Kalmbach Publishing Company. Price $1.50 each; 21 pages each; 10" x 14".

Titles of the albums are as follows: Book 1, *Mississippi Stern Wheelers,* compiled by Captain Frederick Way, Jr.; Book 2, *Great Lakes Sailing Ships,* compiled by Henry N. Barkhausen; Book 3, *Our Navy's Fighting Ships,* compiled by Lieut. Comdr. William C. Moore, USNR, and Lieut. Comdr. John H. Kemble, USNR· and Book 4, *New England Fishing Schooners,* compiled by Joseph C. O'Hearn.

This series of ships and sailing albums is identical in format to the popular series of railroad books produced by Kalmbach Publishing Company. The text is concise and factual and top-ranking photographs give an astonishing portrayal of the fascinating ships and scenes. Each album contains approximately 50 illustrations. With the exception of one picture, the illustrations in *Our Navy's Fighting Ships* are Official U. S. Navy photographs. The books are bound so as to allow extraction of any page if framing of pictures is desired.

The last of this series of albums, No. 5, *Early Great Lakes Passenger Steamships,* will be published shortly.

Summary of Report on Tramp Shipping

EDITOR'S NOTE:

The Committee on Tramp Shipping of the Maritime Commission recently notified the Shipowners' Association of the Pacific Coast that a fresh study of tramp shipping under U. S. flag operation was being undertaken by the Commission, and requested various factual data.

The Policy Committee of the Association consisting of W. R. Chamberlin, Jr. (Chairman) of W. R. Chamberlin & Co., G. A. Dondon of Pope & Talbot, David Gregory of Olympic Line, and R. S. Kimberk of Coastwise Line, has prepared a comprehensive report for the Commission, and it is very well summarized in the following closing pages by Ralph W. Myers, President of the Association.

The Shipowners' Association of the Pacific Coast consists of the following:

Burns Steamship Co.
W. R. Chamberlin & Co.
Coastwise Line
James Griffiths & Sons
Olympic Steamship Co.
Pope & Talbot, Inc.
J. Ramselius & Co.
Schaefer Bros. Steamship Line.


Ralph W. Myers, President of Shipowners Association of Pacific Coast.

In summary: Tramp Shipping is the irregular and/or non-scheduled movement of dry cargoes of low value commodities between ports on a voyage charter or a time charter basis, principally in full shipload lots of one commodity on or under deck. It is by nature a seasonal business. It is worldwide in scope, and to be successful, cannot be restricted to ports or areas. Due to the large volume of such cargoes and the seasonal movement, there always has been and always will be a large world tramp fleet to move these cargoes, because it is economically unsound to maintain a sufficient number of vessels on the regular berth services to move these cargoes.

There is a definite need for an economical medium of transportation, which is afforded by tramp ships because of (1) their low capital costs, (2) their low overhead, and (3) their ability to carry full cargo lots of one commodity. The liner services prove inadequate for carrying tramp type cargoes for five important reasons: (1) They cannot supply adequate tonnage space to take care of full cargo shipments of one commodity. Hence, they would prove wholly inadequate in trying to handle the tremendous seasonal flow of traffic that ordinarily goes to tramp vessels. (2) They are restricted by their Conference obligations from carrying commodities at an economical rate. (3) They would be unable to maintain their schedules if they were restricted to shifting, loading and discharging provisions in voyage contracts, which are ordinarily customary to the several trades. (4) They would be restricted in maintaining their schedules because of their inability to assemble all tramp type cargoes at one point, as they are able to do with their liner cargoes. (5) In many instances, they do not serve ports regularly or seasonally served by tramp ships, because of lack of port facilities, shallow draft, and other considerations.

Major tramp routes are worldwide in scope and cargoes flowing over these routes are dependent upon seasonal influences and market demands.

American tramp ships should be permitted to organize themselves into or to join tramp conferences for rate

TRAMP SHIPPING

stabilization purposes. In order to accomplish this, the Shipping Act of 1916, as amended, should be revised to allow tramp ships the benefit of conference protection.

The largest tramp fleet before the War was Great Britain's, and from performance figures, it was very profitable. It provided Great Britain with a tremendous reserve of ships to be called upon in time of war, which purpose can be accomplished by this Nation with a sizeable tramp fleet.

Thirty-two per cent of all inbound and outbound commerce of the United States before the War was composed of bulk commodities that would lend themselves to tramping service. Of this, American flag ships carried less than ½ of 1%.

United States companies engaged in tramp shipping today which have the largest tramp fleets are the berth operators. These operators do own their own liner vessels, which are engaged in their essential trade routes. United States flag companies engaged in tramp shipping who do not have subsidized services or rights to trade over essential routes, for the most part, do not own their own tonnage, nor in many instances, can they afford to buy tonnage for use in tramping trades under the American flag unless they receive assurances of a future for the operation of their ships in the form of Government subsidies. Lacking Government subsidies, the minority of companies who own tramp tonnage are faced with (a) transferring the registry of their ships to a foreign flag, (b) selling their ships to foreign interests, or (c) defaulting on their payments.

Many of the companies engaged in tramp trades, who have previously chartered their vessels from the Maritime Commission, have now turned these vessels back to the Maritime Commission and are using foreign tonnage on a time charter basis to maintain themselves in the world shipping picture. In our minds, this is an indication of a trend which will grow, and it is a turning back to the way of doing business by these companies as they did before the War. This necessarily reacts to the detriment of the Merchant Marine of this Nation.

The type of vessel used in worldwide tramp trades prior to the War, was a double-decked vessel, between 7000 and 9000 tons deadweight, approximately 400,000-500,000 cu. ft. of bale space. It was of shallow draft and its speed was between 7 and 10 knots.

The cost of maintaining and operating American flag tramp vessels is obviously much higher than the cost of maintaining and operating foreign flag vessels.

United States shipping companies cannot be expected to operate tramp vessels after the European Rehabilitation Plan is accomplished (1951) without Government aid. Given an equal chance with their foreign counterparts, many companies will operate vessels in tramp trades. Government assistance should be on a vessel basis and should include the full difference in costs of wages, overtime, bonuses, subsistence, maintenance and repair, expendable and consumable stores, insurance, construction or purchase price. It is our opinion that very few changes will be required in the basic laws of the United States affecting shipping, and for the most part, it may be adequately handled by amending the Shipping Act of 1916, as amended, and the present Merchant Marine Act of 1936, as amended.

We believe that considerably less than 1% of the expenditure of $10,000,000,000 for additional defense purposes would be sufficient to subsidize and to insure an adequate American Merchant Marine. Financial risks which confront United States steamship companies in tramping under U. S. flag are for the most part the same risks which confront United States steamship companies in the liner services.

American labor will definitely participate in and benefit by the operation of American vessels tramp shipping, because it provides employment and training opportunity for seagoing, shoreside, management, ship-repair yard and ship-building yard personnel.

The tramp of the Merchant Marine would be of inestimable value to the United States, both commercially and militarily, for it would make available to shippers engaged in foreign trades more American flag tonnage adequate to suit their needs, provide a transportation medium for raw materials and bulk cargoes, and under abnormal conditions, it would enable the Merchant Marine to fully meet the requirements of United States exporters and manufacturers and importers of raw materials, and to fulfill its mission of becoming an adequate military auxiliary.

We do not believe that this Nation should make the mistake again of having an inadequate Merchant Marine, and that the Merchant Marine of the United States should be commensurate with the responsibilities of this Nation in international politics. The size and condition of a Merchant Marine lends prestige to the nation whose flag that Merchant Marine flies.

Large carriers proved to be essential in the last war, and they will be essential in the next. Availability of ships was proved to be more important than the speed or the type of the ship. We believe that we should have a Merchant Marine adequate so that we can establish a bridge of ships to whichever area needs supplies in time of national emergency.

Therefore, we recommend that this Government do everything possible to foster the development of a tramp fleet, so as to more fully protect this Nation in time of war or national emergency, to insure adequate shipping facilities in normal and abnormal times. It should adopt a policy of leniency and encouragement to tramp shipping companies.

At this writing, the Maritime Commission and the Shipping Industry are well aware of the fact that Foreign Operators, who have purchased Liberty vessels, are offering to charter these vessels for from one to three years to Americans at time form charter rates which are less than the cost of operating a Liberty vessel under the American flag, and the Foreign Operators are also at times offering to carry cargoes at rates and on charter conditions that are less than the rates needed by the American Operators for profitable operation.

Finally, we recommend that subsidies be granted *all* vessels engaged in foreign-trade.

Early San Francisco Shipping

By A. J. Dickie

IN THIS BEGINNING of a three-year celebration of the centennial of the State of California, it seems fitting that the oldest shipping magazine on the Pacific Coast should revive interest in the shipping and shipbuilding history of the port inside the Golden Gate. The beginnings of both these industries run back into Spanish and Mexican California, and in the case of shipbuilding particularly, into the days of Russian occupation as far south as Fort Ross. Much research has been made into the activities of these periods and there is no claim to originality in this series of articles. Like the great French essayist Montaigne we "have gathered a few flowers from other men's gardens; only the string that ties them together is our own."

Prior to the year 1846 San Francisco was a very quiet little Pueblo, an adjunct to the mission "De Los Dolores de Nuestro Padre San Francisco de Asis," commonly known as Mission Dolores. The town itself was known as the Presidio of San Francisco and was in fact merely the fort and the residence of the garrison established for the protection of the Mission which had been founded in 1776.

In 1834 the Pueblo (Mission and Presidio), which had a population of 500 Indians and perhaps 150 Mexican priests and soldiers, owned 5,000 horned cattle, 1600 horses and mules, 4,000 sheep, goats and hogs, and 2,500 bushels of grain. The Mission pasture lands evidently extended down the peninsula. The Mission Dolores, in partnership with the Mission at Santa Clara, had some time previous to this date bought two schooners from the Russians at Fort Ross and had used these craft for inter-bay transportation of supplies and of hides and tallow. After two or three years use these vessels got to

San Francisco in November, 1848

Another drawing showing San Francisco Harbor and taken about six months after the one in the adjoining column. The island in the distance is the Yerba Buena Island of today and the lagoon in the foreground is the site of the city's financial and shipping district of today. The lower left corner of the lagoon is approximately the location of the office of the Pacific Marine Review.

be rather a burden on the minds and muscles of the padres and their Indian help so they abandoned them and went back to primitive oxcart transportation.

William Richardson, an English sailor, mate of the British whaler *Orion*, had left that vessel and settled at Sausalito some years earlier and he now moved to San Francisco and made a proposition to the Missions that he would put these schooners in ship shape and operate them on the bay carrying the Mission cargoes and any other business he could pick up. The padres accepted this offer and, as their share in the deal, turned over the ownership of the schooners to Richardson. He thus became the first shipping man to live in San Francisco and the owner of San Francisco's first shipping business.

He had no competition, no regulation, and made his own rates. Deep sea vessels came into the harbor in those days to pick up cargoes of hides and tallow or to stock up on fresh water. For cargo they anchored approximately at the location that is now the foot of Jackson Street in the lee of a rocky point that stretched bayward from Telegraph Hill. This point had a sandy beach along its southerly side from which landing and loading was comparatively easy except when southeasters were blowing. For water, the ships anchored off Sausalito where there was abundant fresh water from large springs.

Richardson fixed his rates at 12½ cents per hide and $1.00 per bag of tallow from any point on the bay or the lower rivers to San Francisco or to ships anchored off San Francisco. In the season 1835-1836 exports amounted to 20,000 hides and 1,000 tons of tallow. As this was probably all handled by Richardson's schooners, his gross

income from freights would be approximately $23,000 that season.

Shipping and the Pueblo of San Francisco continued in this sleepy existence until 1846 when on July 9 it was suddenly roused out of its lethargy by the United States frigate *Portsmouth* under command of Captain Montgomery who came ashore with a corps of Marines and raised the Stars and Stripes over the sleepy plaza (now Portsmouth Square) declaring San Francisco an American city—a city of perhaps thirty nondescript buildings scattered along four streets, which were named by the Americans, Montgomery (along the waterfront), Kearny, (parallel to Montgomery one block west), and the two intersecting streets Clay and Washington.

Nineteen days after this flag raising the good ship *Brooklyn* sailed through the Gate with 238 passengers, mostly Mormons, under the leadership of San Brannan. This ship had put out from New York bound for Portland, Oregon, and for some reason stopped in at San Francisco, and San Brannan and his passengers elected to remain, becoming the first group of American civilians to settle at this port. By January 1847 the American population was about 300 and by March 1848 it had grown to 800. At this period San Francisco was by no means the best known or the largest port on what is now the Pacific Coast of the United States. On every count it was bettered by such now comparatively less important ports as San Diego, San Pedro, and Monterey, in California, Astoria and Portland in Oregon. and Sitka, Alaska (then Russian). The California trade of hides and tallow was very poor pickings for the shrewd tradership masters of those days when compared with the fur trade of Oregon or Alaska. Astoria and Portland had become the centers of the fur trade, dating back into the days of the Hudson Bay Company regime in that section. This comparative unimportance of the Golden Gate with its great harbor is well illustrated by the action of Congress on March 3, 1847. For some time the legislators had been considering the establishment of a mail route by steamer from the Atlantic Coast to the Pacific Coast. On the date alluded to above an act was passed for this purpose. The route chosen was via the Isthmus of Panama and a fairly liberal subsidy was offered. This act resulted in the founding of the famous Pacific Mail Steamship Company. However, the significant feature of the act as first passed was the omission of San Francisco; the city was not even mentioned. In the middle of the following year San Francisco was added to the act as a port of call on the way to Portland. However, none of the steamers built under this act ever got to Portland because when the first vessel was ready to steam around to the Pacific the gold rush had already started and she and her following sisters were so profitably engaged in carrying goods and passengers from Panama to San Francisco that Portland was forgotten.

In March 1847 the entire floating equipment on San Francisco Bay comprised: three transports (just arrived with Colonel Stevenson's regiment); the ship *Vandalia;* a coastal schooner; a small steam launch; the ship *Brooklyn;* and two rowing boats. By June 1848 the rumors of rich gold deposits up state had been confirmed and suddenly almost overnight the city was depopulated. However, as the unsuccessful miners drifted back and the would-be miners from outside began pouring in, there were 2,000 persons in the city by January 1, 1849.

Official returns for the year ending March 31, 1848 shows arrivals of 85 vessels, including: 58 small coastwise ships; sixteen whalers; seven small craft from Sandwich Islands; and four U. S. Naval ships.

By January 1, 1850 the population was over 20,000 and 697 vessels had arrived in seven and a half months. On practically all of these vessels the crews and sometimes the officers ran off to the mines. Many of the ships were so-called "company ships," that is, ships owned and operated by companies formed and financed for the purpose of mining. Some of the deserted ships were bought at very low prices, hauled up on the mud flats and used as buildings. These ships came from every quarter of the globe, and San Francisco suddenly was a world port with a cosmopolitan complexion that she has retained ever since. San Francisco (still a Pueblo governed by an Alcalde) had become a commercial port with practically the same commercial standing as Philadelphia. She was a world port before she became a chartered city and before California became a State.

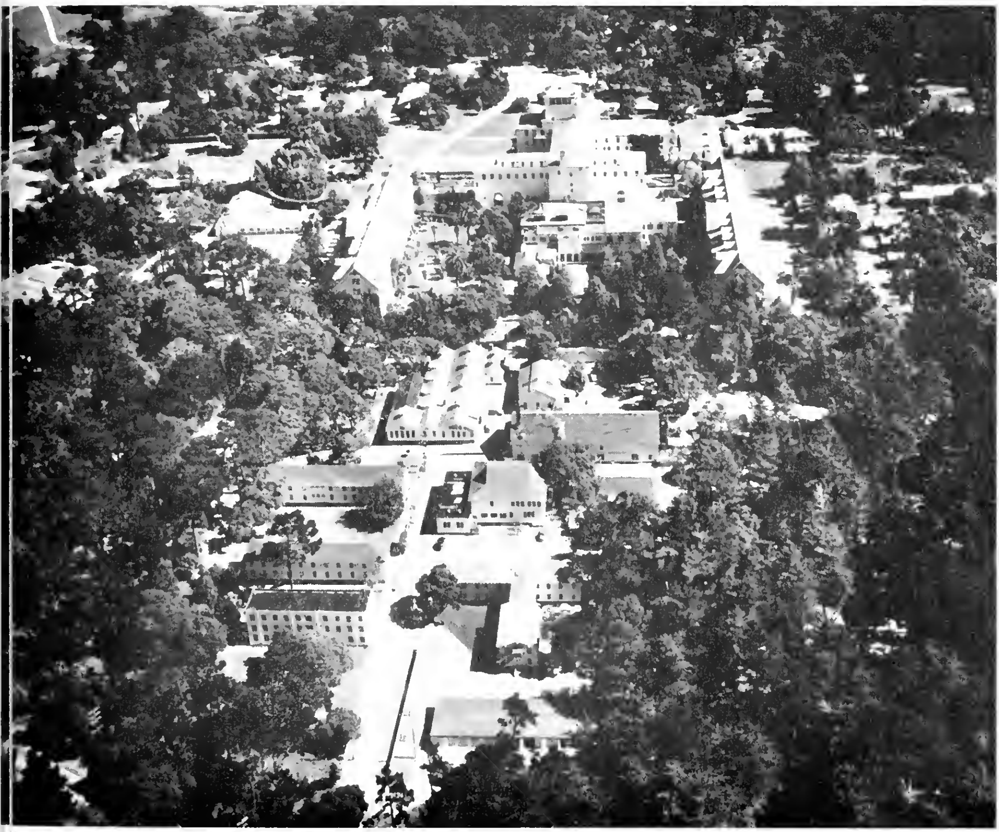
New World at Cunningham's Dock, San Francisco, 1850

U. S. NAVAL SCHOOL
GENERAL LINE
MONTEREY, CALIFORNIA

Plans for the School

The Naval School, General Line, at Monterey (Del Monte) was authorized in September, 1947 by the Secretary of the Navy to implement the famed Holloway Plan for the post-graduate education of Naval officers. There was an immediate need for a school to give temporary and reserve officers who have transferred to the Regular Navy a broad general education on Naval subjects in order that they might have the broad service background of the Naval Academy graduate. The Naval School, General Line, at Newport, Rhode Island, convened in July, 1946 for this purpose. As its facilities were

Del Monte Hotel in center. Navy radio school buildings in foreground



Commanding Officer,
Capt. Frank T. Watkins,
USN

limited in respect of the number of former reserve and temporary officers requiring this course, the war-time Naval Training School at Del Monte, California, near Monterey was selected as a site for a second General Line School.

At present, the property occupied by the Naval School, General Line, Monterey, California is under contract from Del Monte Properties Co. However, the Government has an option to buy this property and certain additional adjacent properties. The purchase of same is awaiting congressional appropriation. The option expires on July 1, 1948.

Until purchase of the property is made, only the subjects required for General Line post-graduate training will be presented. Subject to purchase of the property by the Government, and in accordance with the Holloway Plan, the Naval School, General Line, Monterey will eventually become in effect a Naval Post-Graduate University where all Naval post-graduate work will be accomplished. This means that the post-graduate school at Annapolis, Maryland, the School of Naval Intelligence and the Naval School of Foreign Languages at Anacostia, Virginia will be discontinued and all their post-graduate functions will be transferred to Monterey. The Naval School, General Line, Newport, Rhode Island will continue to operate until all reserve and temporary officers who transferred to the regular line of the Navy have completed their course. By that time, all Naval officers, upon completion of their first tour of sea duty after becoming a commissioned officer, would be required to take the General Line course requiring one year. Certain numbers of the graduates of this course will be permitted to take further post-graduate work at the post-graduate school in various technical subjects such as Marine Engineering, Aeronautical Engineering, Ordnance Engineering and other allied Naval specialties. Other graduates of the General Line School may complete their technical education in certain civilian universities and institutions of higher learning, while the remainder will be assigned shore billets in the Naval Shore Establishment until again eligible for sea duty.

The property now under contract by the Navy comprises a total of 241 acres, the largest section comprising the grounds of the famous Del Monte Hotel of past years. The main hotel building is being employed for administrative offices, bachelor officers' quarters and interim housing for Naval officers with their families. The main building also provides mess halls, and recreational areas. There are nineteen other buildings including a laundry, garages, a power house, swimming pool, and classrooms. Upon purchase of the property the land to be acquired by the Navy will total 606 acres, of which 309.8 acres will be available for Naval housing on the west side of the Del Monte Golf Course.

The designed capacity for the Naval School, General Line, at present is 500 officers. After purchase of the property and resulting development, a student body numbering 2,600 student officers will gradually be built up as post-graduate school facilities and laboratories become available.

Curriculum

The General Line School will be provided with ample laboratories and classrooms to teach the following subjects:

Communications
Strategy and Tactics
Combat Information Center
Operations
Anti-Submarine Warfare
Aviation
The Foundation of National Power
Naval History
Naval Intelligence
Administration and Leadership
Submarines
Logistics
Ordnance and Gunnery
Seamanship and Navigation
Meteorology
Steam and Marine Engineering
Damage Control for Ships
Radiological Safety
Electrical Engineering
Physics
Mathematics

The above subjects will require four terms of eleven weeks each, including a total of 1,135 hours. The students will be divided into sections of 25 officers each. Duration of the average recitation period will be 50 minutes and the laboratory periods will occupy two hours.

The Naval School, General Line will have the benefit of the latest in training equipment. To assist the instructors there will be such training aids as sound moving pictures and lantern slides, numerous synthetic training devices which were one of the training wonders of the last World War, scale models of ships, machinery layouts, ordnance equipment, and aircraft. Assigned to the School for drills and instruction under actual operating

conditions will be a destroyer, a destroyer escort, a submarine, and various types of aircraft. The Naval Auxiliary Air Station at Monterey was commissioned to maintain the flight proficiency of student and staff aviators.

Heads of Departments

Heads of Departments were selected on the basis of their previous experience. Departmental instructors are all well qualified to teach their assigned subjects by reason of duties previously assigned in the Fleet. The subjects of Electrical Engineering, Physics, and Mathematics will be taught by able civilian instructors who have had experience in teaching at engineering schools at various prominent civilian universities. Department Heads are as follows:

Commanding Officer, Captain Frank T. Watkins, USN

Executive Officer, Captain C. McClusky, USN

Operational Command Department, Captain R. J. Archer, USN

Administrative Command Department, Captain A. C. Perkins, USN

Ordnance and Gunnery Department, Commander W. L. Harmon, USN

Seamanship and Navigation Department, Captain A. R. St. Angelo, USN

Engineering and Damage Control Department, Captain F. P. Luongo, Jr., USN.

Top to bottom: Former registration desk of Hotel Del Monte now being used as Officer of the Deck's Office.

Lobby of Del Monte Hotel.

Roman Plunge at Del Monte.

Hollander Invents New Type Diesel Engine

A new type ship's diesel engine, half the size and less than half the weight of the type now in general use, has been completed early this month by Werkspoor, one of Holland's largest makers of ship's engines and railway equipment. The new engine is also more easily accessible and more economical than the prevailing type, and can moreover utilize the heaviest type of fuel oil.

The diesel engine is the invention of G. J. Lugt, a marine engineer with forty years of practice, who started to work on his plans in 1943, in the midst of the German occupation of The Netherlands. Left undisturbed in his drafting room by the Nazis, who little suspected on what sort of work he was engaged, he completed his plans—on paper—toward the end of the war. Immediately upon Holland's liberation, Werkspoor initiated large-scale research work on Lugt's invention, and the first experimental engine is now ready.

The engine is a 1,200 H.P. two-cylinder affair equipped with the most modern technical improvements. It can also be made with three, four or more cylinders, as each cylinder is an independent unit.

A six-cylinder diesel engine of this type has a capacity of 3,600 H.P. the same as an eight-cylinder four-stroke engine now being made by Werkspoor. It is far less noisy and weighs only 140 tons, against 315 tons for the older type.

Modern Oil Tanker Design

By FRANK L. PAVLIK
Sun Shipbuilding and Dry Dock Co., Chester, Pa.

Introduction—

The unprecedented demand for petroleum products during World War II created a problem in logistics that was solved by the mass production of modern tankers for the transportation of these products. In the last days of the war the American oil industry was producing at an average rate of 4,600,000 barrels per day, and of all the supplies that were required by our Armed Forces including food, clothing, arms, armament, ammunition, shelter, medical supplies, etc., petroleum products represented more than sixty per cent by weight. Practically all of these oils were transported by tankers which constituted floating pipe lines to every fighting front. In wars of the past, one of the big problems was to supply food to the armed forces. During this war, the volume of petroleum products moved to the front was almost sixteen times that of the food.

In 1945 the American oil industry produced at the rate of 1,828,500,000 barrels annually; the world production for the same period was 2,737,000,000 barrels. The postwar era has produced an even greater demand for petroleum, and it is estimated that by 1951 the annual production of the American oil industry will have been increased to 2,026,000,000 barrels; and the world production will be about 3,583,000,000 barrels. On the national basis this represents an eleven per cent increase over the production of 1945. The bulk of this oil will have to be moved by tanker, so that the need is apparent for the maintenance and building of a large and modern tanker fleet as a peacetime necessity, and as an important branch of our national defense set-up.

The recent national emergency found us lacking in many of the components required in tanker construction and substitutes had to be found, more often than not at greatly increased cost. By instituting a planned replacement program for our present fleet, enlarging it as we go, the costly lessons of the past will not have to be repeated. In 1939 the deadweight tonnage of the U. S. tanker fleet was 4,559,000 tons representing 23.9 per cent of the world fleet. By 1945, and principally as a result of the U. S. Maritime Commission program, this had increased to 59.8 per cent. From 1945 to 1947, U. S. deadweight tonnage has decreased to 59.2 per cent. The necessary construction in bulk quantity, as it were, of the T-2 class tanker has given the U. S. tanker fleet a preponderence of one class of vessel resulting in an unbalanced distribution as regards size, type and speed. Only 22 per cent of the U. S. tanker fleet is under 16,000 tons deadweight, whereas 88.3 per cent of the world tanker fleet is below that figure. More modern tankers in other categories are required particularly those for shallower drafts. At present the U. S. A. has the largest tanker tonnage in the world, but this will be shortly challenged by the construction proceeding abroad where shipyards are contracted to capacity through 1950 for the construction of all types of merchant vessels. The following figures may be of interest to illustrate this: 69 vessels totaling 950,215 deadweight tons are building in the United Kingdom while Sweden has 29 ships on order totaling 409,995 deadweight tons.

(This outstanding paper was presented by Mr. Pavlik at the February meeting of the Society of Naval Architects and Marine Engineers, Philadelphia.)

The trade requirements of a tanker must be carefully analyzed before proceeding with a design; a stereotyped arrangement will not meet specific conditions in the highly competitive field of tanker operations. Often the principal dimensions themselves are limited by terminal facilities, etc. A vessel that is to transport cargoes of a single grade requires a simpler tank and piping arrangement that a vessel carrying mixed cargoes. The cubic of vessels built to carry gasoline and other light gravity oils must be adequate for the available deadweight. The following material will be limited to the ocean tanker in merchant service.

Deadweight and Speed

Prime factors in the design of a tanker from the Owner's point of view are the deadweight and the speed of the vessel. The total deadweight is the difference between the displacement and the weight of the ship alone. Included in the total deadweight are cargo, fuel, feed water, potable water, stores, crew and effects. The cargo deadweight is the revenue producing factor which carries the whole business enterprise, so that weight saving in all other elements is a requisite from the standpoint of financial success. Cargo deadweight should be used as the basis for making comparisons between tankers with different types of hull construction and/or propulsion machinery.

Within this decade, technological developments coupled with improved materials and methods of construction have resulted in substantial reductions in ship weights which, for a given displacement, have resulted in increased deadweight. Examples of this are the employment of welded construction in hull and machinery, and the trend to high pressure and temperatures in steam propulsion machinery installations.

In the United States emphasis appears to have been placed on deadweight; for a given speed the models are relatively fuller, and the average deadweight of American tankers is higher than that of tankers built elsewhere. The ratio of deadweight to displacement for present tanker practice is listed in Table I.

TABLE I

Deadweight	Deadweight/Displ. Ratio
5,000	0.690
10,000	0.725
15,000	0.755
20,000	0.785
25,000	0.805

The above is predicated upon the use of welded construction for the hull. Where Owners require a greater elaboration in any or all of the ship weight elements, a corresponding reduction in deadweight will result. Some owners have discovered that the addition of extra material in certain spots reduces maintenance bills, and are willing to sacrifice some deadweight to effect this end.

The trend of tanker speeds has been upward and is evidenced by the figures for the world tank ship fleet presented in Table II

TABLE II

Year	Speed
1900	9.03 Knots
1910	9.38 "
1920	10.01 "
1930	10.29 "
1940	11.18 "
1945	12.85 "
1947 October 1st)	13.10 "

An analysis of speeds show that in the U. S. tanker fleet only 22 per cent of the vessels are slower than 14 knots while for the balance of the world fleet 84 per cent are slower than 14 knots. Again the large number of T-2 tankers disproportionately affects the average in this respect. Generally speaking, the trend in Great Britain has been to build three classes of tankers, viz: those of 8,000 tons deadweight and 11 knots speed, 9,000 tons deadweight and 12 knots speed, and 12,000 tons deadweight and 12½ knots speed.

Principal Characteristics

For economical propulsion there is a close relationship between the length of a vessel and the fullness of form. For the vessels under discussion, at a speed-length ratio of 0.65, this relationship may be expressed by a variation of the Alexander formula where Block Coef.$=1.075 - V/2\sqrt{L}$, V being the service speed. The amidship section is generally quite full, with coefficients varying from 0.980 to 0.995, and the percentage of parallel middle body ranging from 24 to 28 per cent. Some owners prefer to have their vessels designed with the bottom having a small rise of floor, claiming that it assists drainage. On the other hand, the lines of the vessel with the flat bottom can be made finer at the ends, thereby tending to decrease resistance to propulsion.

The location of the center of buoyancy is the result of a compromise between the requirements for minimum resistance and suitable trim, and the latter factor most seriously influences the final decision. At speeds corresponding to $V/\sqrt{L}$ 0.65, the center is usually located from one to two per cent forward of the amidship half length of the vessel, and small variations either way have little effect upon resistance.

The ratio of the length of entrance to run varies between limits of 0.75 to 0.90 with the latter value in more common use.

In general, tankers built in the U. S. A. have proportionately a greater beam and depth than those built elsewhere. The beam may be expressed as a function of the length, varying approximately between limits of $(.1L + 18)$ and $(.1L + 20)$. The depth may be expressed in a similar manner, varying between $(.07L + 3)$ for vessels with normal sheer and $(.07L + 4)$ for vessels with no sheer.

Table III gives the principal characteristics of some recent tankers on a peacetime basis.

TABLE III

	(1)	(2)	(3)	(4)	(5) Brit Type
Length BP	521	503	450	309	460
Breadth	70	68′ 3″	65	48′ 2″	59
Depth	40	39′ 3″	37	21′ 9″	34
Draft	30′ 4½″	30′ 2″	29′	19′ 4″	27′ 3¾″
Block Coef	0.777	0.740	0.732	0.735	0.757
Displacement	24670	21880	17790	6200	16793
Deadweight	19200	16600	13110	4240	12355
Dwt/Displ	0.78	0.76	0.74	0.685	0.736
Capacity, Bbls	154760	141160	111160	31300	—
Service Speed	13	15½	14½	11½	12
S H P	5000	7500	5000	1400	3600
Machinery	Turbo-Elect.	Turbo-Elect.	Turbo-Elect.	Geared Diesel	Direct Diesel

In vessels (1) through (4) welded construction was employed.

In the design of any vessel it is essential to prepare a reasonably correct estimate of weights and centers of gravity for the determination of deadweight and trim. This is particularly true for the tanker where the weights of propelling machinery and expendable items such as fuel, water, etc. are quite removed from the general center of gravity of the vessel and the long levers produce considerable trimming effects.

Tankers transiting the Panama Canal should have their loaded trim conditions for arrival at the Canal investigated, so that without undue ballasting or shifting of fuel the vessel may comply with regulations. For this condition the vessel will be required to have a trim of not less than 6 inches nor more than 36 inches by the stern, and be on an even keel as regards list.

Design procedures in different shipyards vary somewhat so that the following is suggested as one of many ways of arriving at the required answer.

1. An estimate should be made of weights and centers from accumulated data for similar vessels.

2. Revise the above estimate when basic design plans are completed and the various weight groups such as hull steel, propelling machinery, outfit, etc. can be analyzed on the basis of accumulated data and approximate calculations.

3. Make detailed calculations from working plans as the work proceeds in the drawing room.

It can be accepted as almost axiomatic, that as construction proceeds, the weights have a tendency to increase.

Apart from the design stage, is the final determination of the light weight and longitudinal center of gravity,

etc. as the vessel is being completed in the wet basin. Conditions are seldom ideal for reading drafts and taking all other data necessary to arrive at accurate results. May we strongly urge that enough time be taken to obtain reliable data, that the vessel be as nearly complete as possible and that a minimum of fuel, water, etc. be placed aboard. An inclining experiment should be performed on at least one vessel of each class in order to determine the vertical center of gravity for purposes of stability. The data thus obtained is invaluable to the Owner for determining operating conditions, and as a basis for computations if any alterations are made, and to the Builder for reference data.

The metacentric height for tankers of normal proportions is more than adequate under all normal conditions of operation and the following values are given to indicate their possible range:

Light Ship	12′ to 20′
Loaded Ship	5′ to 8′

Although most tankers have excellent subdivision and can generally comply with the requirements of the two compartment standard, a routine flooding calculation should be made, particularly in way of the ends of the vessel. This will show whether the vessel can survive a collision damage, for example, in way of the machinery spaces.

The determination of maximum permissible drafts under the Load Line Act calls for little comment. It has been resolved into a simple straight-forward calculation by the regulating of the International Load Line Convention, London, 1930 and much credit is due that body for formulating such a comprehensive, yet readily applicable set of rules.

In many tankers the freeboard deck is designed with no sheer in order to simplify construction. The heights of the poop and forecastle are usually increased toward the perpendiculars to improve seaworthiness and appearance. Where these heights exceed the standard height for erections as required by the Load Line Rules, and the erections are fitted with proper closing appliances, credit may be claimed in the load line determination for a theoretical sheer line as indicated in Fig. I.

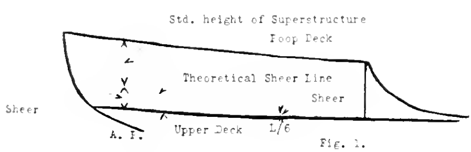


Fig. 1.

In a vessel with no sheer it is necessary to increase the moulded depth in order to obtain the same drafts as would be assigned to a vessel with normal sheer, the increase amounting to approximately 18″ in a 500 foot ship. Of the three dimensions, length, beam and depth, the latter is the cheapest to increase; and the depth increase is not entirely a penalty as a maximum of cargo cubic is gained thereby and the steel is utilized to a better advantage in the hull girder in the region of maximum bending moments.

The camber employed is usually a broken pitch equivalent to a parabolic camber to rule requirement, and is used to simplify structural fabrication and assembly.

The marine fraternity has long felt the need for a revision of the tonnage admeasurement rules in some such fashion as has been applied to the load line regulations. The tonnage rules are archaic, and in verbiage and illustration hark back to the days of the wooden vessels. In the light of present shipbuilding practice, they are ambiguous, misleading and subject to individual interpretation in many respects.

Be that as it may, it still behooves the designer to be thoroughly conversant with the present U. S. and Panama Tonnage rules, including exemptions and deductions, so that minimum gross and net tonnages will be assigned to a vessel.

The U. S. gross tonnage is used for assessing dry docking fees, port charges, insurance premiums, etc. The U. S. net tonnage is used for tax determinations in foreign trade. The Panama Canal net tonnage is used for assessing the tolls when a tanker is making the transit of the canal.

The net tonnage is determined by subtracting the following tonnage items from the gross: machinery space, steering gear, anchor gear, crews quarters, chart and radio rooms, bosun's stores, etc. Under the U. S. Rules, if the tonnage of the machinery space is in excess of 13 per cent of the gross, the official deduction is 32 per cent; otherwise only one and three quarter times the actual tonnage of the space is allowed. (Danube Rule). The Panama Rules are basically similar to the U. S. Rules but vary in that they only permit use of the Danube Rule for machinery space deduction, and are more stringent in respect to other exemptions and deductions. Therefore, the Panama tonnages are always considerably higher than the U. S. tonnages.

In regard to the determination of cargo capacities, there has been little improvement in the time tried method of gauging tanks with steel tape and sounding weight and referring the ullages so obtained to a set of calibration tables. It is not always practicable to locate ullage covers over the center of area of a tank so that effects of list and trim may be minimized. There is always the fire hazard associated with opening ullage covers and permitting explosive vapors to emanate therefrom. Owners require that capacities be correct to within 0.5 per cent, and with variable hydrostatic heads, it is difficult to find direct reading pressure gauge devices, Manometers, etc. that can consistently meet this condition. There are satisfactory commercial gauging devices that eliminate the fire hazard. They employ a float attached to a steel tape that reels in an enclosed housing located on deck, and ullages may be read through a window in the housing; the ullages so obtained are referred to the calibration tables. It requires no great stretch of imagination to conceive of an electronic ullage recorder; possibly a tape could be developed where the cost would not prohibit its commercial application.

The calibration tables are computed using final mold

(Please tuhn to page 83)

Pacific WORLD TRADE
Reg. U. S. Pat. Off.

Observations on Shanghai, Hongkong and Manila

By ELLIOTT McALLISTER
Vice-President, The Bank of California, N. A.

SHANGHAI

A WEEK IN SHANGHAI convinces me that the old order of affairs is definitely out. In place of the former well regulated International Settlements, there is control exercised by an extremely nationalistic Chinese Government that is jealous of its new position. Actually Shanghai is no more representative of China than New York is of the U.S.A., but as the largest city of the country with a population undoubtedly over five million, and the country's great export and import point, it is the city which most concerns us.


Elliott McAllister

Today Shanghai is full of refugees from all of North China, farmers and villagers driven in by the civil war. It was frequently suggested that I fly to Pekin to take a look at "Old China" but this would have to be over Communist lines. The war today is probably draining 75% of the Government's income and a very poorly paid army and civil service is turning to "squeeze" to get by. In the old days it was "honest squeeze" corresponding to our system of brokerages, tips, etc., but now it is "dishonest squeeze" in a big way. This you hear on all sides. When you attempt to evaluate the situation you should bear in mind that the country has been fighting continuously since 1932.

China of course has lost Manchuria as an economic unit and this has been a severe blow; otherwise the war for the last two years has been deadlocked. Transportation has broken down and it is difficult to move goods from the interior to seaports. To get by, the government has turned to the printing press and bills in larger and larger denominations are in circulation. I couldn't help but think that China is using plenty of foreign exchange just to pay these printing bills, because Shanghai is full of nice new currency. It was startling at first to be sold a four page newspaper "for only $5,000," but you soon get used to it. One of the bright eyed little newsboys picked me for a stranger and told me they sold for $10,000. My room rent at the Cathay Hotel was $640,000 a day, and a few days after arrival I received a notice saying that the management was very sorry but because of circumstances beyond their control the daily rental was to be increased to $800,000.

The official rate of exchange is fixed each day by a committee. This rate is applicable to all licensed export and import transactions, but otherwise is disregarded. The authorities are trying to hold the rate down in order to hold down living costs, but the spread between the official and black market rates makes this difficult. The many "brokers" seem to set this rate more or less firm for a given day and word gets around very quickly as to what it is. A visitor can cash travelers checks at black market rates without difficulty almost anywhere except at a bank, and as a result the banks never see them. Where the system is bad is that the foreign exchange spent by a visitor never helps the Chinese economy—his money never gets into banking channels.

China's shortage of U. S. dollars is acute. All banks must report to the Central Bank of China at noon each day all purchases and sales and these must balance within $2,000; otherwise the bank has to cover by purchasing

or selling. These reports are cumbersome and must be filled in in great detail. The foreign banks, some of which have been in Shanghai for almost a hundred years, now find themselves at a great disadvantage and are pretty much discouraged as to prospects. Those banks do not have the fixed C.N.C. deposits enjoyed by the Chinese banks and their own current deposits move fast;—one leading bank told me they frequently lost 30%-40% of their C.N.C. deposits one day and regained them the next. The result is that these banks are not in a position to extend many large loan lines and this business is going to the Chinese banks—who then get the benefit of negotiating the export Letters of Credit.

Interest rates run from 9% a month to 25% a month, and dollars can be sold a month forward to the Central Bank, and when this is done the Central Bank advances C.N.C. at an interest rate of 6% per annum. However, most exporters (whatever there are of them) prefer to forego the saving in interest and think they can do better by holding the dollars until the last minute. And with the continuous depreciation of the C.N.C., they have been right.

Along this line, several foreign banks told me of the troubles and risks incurred when they found themselves unable to deliver dollar bills sold forward to the Central Bank. These instances have come about through the inability of the exporter to make the shipment, but the Central Bank will take months to settle. Last summer Nanking fired a lot of top people and their successors are unwilling to assume a responsibility which might possibly get them in trouble. Applications for a cancellation of a contract must be supported by detailed reports explaining why the shipment cannot be made, and with the exchange rate going steadily higher, a number of substantial losses have been incurred.

To give an idea of the general chaotic condition now prevailing in Shanghai, the Economic News Bureau reports that the face value of dishonored checks returned by the Bankers Clearing House during the five days, October 27-31, totalled over $174,000,000,000 (174 *billion* C.N.C.). I was told that many of the smaller Chinese banks unable to meet checks themselves would refuse payment in spite of the fact that the drawer had sufficient funds on deposit. The next day they were "so sorry." The great bulk of dishonored checks, however, were drawings against uncollected funds.

The Chinese banking system is headed by the Central Bank of China, the agent of the National Treasury in

(Please turn to page 110)

HONGKONG

THE BRITISH ARE IN HONGKONG to stay and I believe that many prominent and well-to-do Chinese are perfectly satisfied with the arrangements. Hongkong, with a population of over a million, today impresses you as a busy, and well run city, although many scars left by the war still remain. In particular, the heights in back of the city are dotted with large homes, not yet repaired, which were looted by the Chinese during and after the Japanese occupation. And when I say looted, I mean that not only were the furnishings taken, but glass, plumbing and fixtures are gone, including floors, window sills and roofs, Only the shells still stand.

A very considerable business now goes through Hongkong,—goods smuggled in and out of China proper. While the British know that this smuggling is going on, they wink at the business and feel that their first consideration is to keep Hongkong on the map as a large shipping center. Without this shipping, Hongkong would be dead.

Hongkong is of course a member of the Sterling block and it is difficult to get a permit for U. S. dollars unless you are importing a product considered important for the Colony's welfare. When such a permit is granted, an importer obtains U. S. dollars at the official rate of approximately 4 Hongkong to 1 U. S. dollar. The au-

SHANGHAI—PREWAR

Pacific World Trade

thorities, however, have hit upon an ingenious scheme to turn black market exchange into useful channels. Instead of wasting their time and energies trying to suppress that market, they tell approved importers to go right ahead and purchase U. S. dollars whenever they can find them as long as they will use those dollars to buy merchandise to be imported into the Colony. They use the phrase "unofficial exchange" or "free exchange" and while the large banks do not deal in such exchange, the many small Chinese banks do. Right across from the Hongkong Hotel are two shops with big signs "Exchange Brokers," and these rates are also published in the newspapers. The rate has been running around 5.25 to $1.00 U. S., which means that goods so imported will cost a little more than 20% higher than goods imported officially. The result, however, is that shops are full of merchandise and you can buy anything. California oranges and other products are plentiful, although merchandise from Australia and Canada has been underselling ours and is much in evidence.

Goods in Hongkong are subject to price controls and price tags must be prominently displayed on everything. Australian butter retails for the equivalent of 55c a lb. U. S., and eggs are about 50c U. S. a dozen. I was told that warehouses are full of merchandise of all sorts.

To get back to the unofficial exchange again, I asked one of the importers to show me some of the U. S. dollars just purchased by his firm. I was shown a stack of checks, drafts, travelers checks and money orders, much of which had changed hands many times, mostly small personal remittances up to a few hundred dollars U. S. There was a check drawn by the Havana Branch of the Bank of China on their New York correspondent, finally cashed in Hongkong. The Chinese bank, in selling the batch, guarantees all prior endorsement; the checks are deposited in the importers regular bank which T. T's. the funds to be paid out in the U. S. Sometimes the importer here merely mails the checks to his own connection in the States.

On the export side, a fairly recent ruling permits an exporter of tung oil to retain 75% of the U. S. dollars resulting from such exports. The remaining 25% must be turned over to the dollar pool. This will of course greatly encourage the flow of tung oil through Hongkong. This rule applies to tung oil only.

In contrast to the Chinese austerity program, the Hongkong authorities believe in a return to normal prewar conditions and as an example, horse racing has been re-established. A group of leading business men has imported 250 Australian ponies which were allocated by lot and they are having a very successful meet. All the leading clubs and firms have boxes, with elaborate lunch parties during the racing.

There is a fair amount of new building going on and it seems to me that in another five years Hongkong will really be a beautiful city again. The setting is there and they have management and direction. The Chinese have again announced plans to build Whampoa into a large deep water port as a rival to Hongkong, but the British say they have heard that sort of talk for thirty years. Even if that should come about, Hongkong still has the banks, shipping and insurance firms. It's a nice place to visit if the weather is good.

MANILA

MANILA was one of the most heavily damaged cities of the war and it will take many years to rebuild it. On all sides stand the skeletons of apartment houses, government buildings and offices and you realize that it is a job in itself to clear away the debris. You then talk to someone who has just returned to Manila after a year's absence and you learn of the improvements that

HONGKONG—
PREWAR

have been made and you realize that Manila is very slowly but surely rebuilding.

I stayed at the Army and Navy Club across from the Manila Hotel. It is still pretty rough there, no hot water, practically no furniture in the rooms and only one telephone downstairs for the use of the members. A friend very kindly placed at my disposal a car and chauffeur and I soon found out that this arrangement is indispensable. Whether you stay at the Manila Hotel or at the Army and Navy Club you have to drive about a mile to get to the financial district and this means getting across the river. The bridge is single lane each way and long lines of cars, six abreast, wait more or less patiently for their turn to get across. There are just a few modern office buildings in downtown Manila, but most firms and banks are housed in old structures. Generally, if the single elevator is running, you have to get in line and wait your turn to get up. And it is always much quicker to walk down.

And yet these downtown buildings one after the other are being repaired and a lot of business is done in small out-of-the-way offices. In particular the Port Area on the Manila Hotel side of the river is growing with modern buildings under construction. Those streets and sidewalks are twice as wide as in downtown Manila proper.

Manila itself, as in the case of most large cities of the world, is overflowing with people. In spite of the fact that there is far less housing available, it is estimated that there must be between 1,500,000 and 2,000,000 people in Manila today against a prewar population of 600,000 to 700,000 people. As you drive through the outskirts of the city, you see a great many families living under the most wretched conditions without sanitary facilities of any kind whatsoever. There is always the danger that an epidemic could break out.

There are armed guards everywhere. A half dozen are stationed at the Army-Navy Club and the homes I visited all had walls or fences around them with a watchman on duty 24 hours a day. The general spirit of lawlessness born during the war has not died. You don't travel far from Manila by car as the Huks have possession of large sections of Luzon Island. These Huks can be defined as groups of guerillas, poor farmers and malcontents in general and there are constant skirmishes between the National Guard and these people with considerable bloodshed. It is much safer to fly between important towns.

President Roxas is well regarded and is considered a staunch friend of the United States. However, he apparently has been either unwilling or unable to surround himself with competent assistants and advisers and his government, while doing well enough, lacks force and direction. I heard a number of men say that they felt the next few years would be good enough, but they weren't too confident of the long pull. In any young government a group with strong nationalistic tendencies could come to the top and they could easily jeopardize the position of foreigners. As an example, during my stay, the Supreme Court handed down a decision barring aliens from acquiring residential lands. This opinion was based on a provision in the Philippine Constitution which limits the utilization of agricultural lands to Filipinos, but the court construed the provision as including residential lands. Americans, who enjoy temporary equal rights with Filipinos under special treaty, are not now affected, but as things stand, no Britisher, Hollander or other foreigner can purchase his own home. It is just a straw in a wind that could blow harder.

The Philippines need money. This means not only the government but the banks also need deposits. Bank deposits are rising, but the demand for loans is even greater and many worthwhile requests for credit lines must be refused for this reason. There is little long term money to be had and it is therefore difficult to finance the construction of a new building or the purchase of a home.

As of September 30, 1947, bank deposits were reported to me to be as follows:

Philippine National Bank	Pesos 146,000,000	Filipino
National City Bank of N. Y.	140,000,000	U.S.A.
China Banking Corporation	38,000,000	Chinese
Bank of Philippine Islands	28,000,000	(Spanish Filipino)
Hongkong & Shanghai Bank. Corp.	26,000,000	British
Philippine Bank of Communication	22,000,000	Chinese
Philippine Trust Co.	22,000,000	U.S.A.
Chartered Bank of I. A. & C.	20,000,000	British
Peoples Bank & Trust Co.	10,000,000	U.S.A.
Bank of America N. T. & S. A.	10,000,000	U.S.A.
Philippine Bank of Commerce	9,000,000	Filipino
Nederlandish Indische Handelsbank	8,000,000	Dutch

Turning to government finances, I was told that the

(Please turn to page 110)

MANILA—

PREWAR

Netherlands Indies Import Trade

The Netherlands Indies Government Import and Export Organization (NIGIEO) was reportedly dissolved on October 1, 1947. Two agencies charged with control of import trade have replaced NIGIEO. The first, the Import Allocation and Planning Organization, which acts as a purely advisory body, submits to the Department of Economic Affairs estimates of the amount of a certain item to be imported and the allocation of this amount among importers. Upon approval of these estimates by the Department of Economic Affairs, the necessary exchange will be made available by the Foreign Exchange Bureau. The second, the General Import Organization (AIO), finances the purchase of such important items as textiles, foodstuffs, bulk goods, sundries (as haberdashery), fertilizers, and chemicals. In practice this means that the prorated allocations for these categories of goods are purchased by the particular import houses and charged to the account of AIO. Once the goods are in the Indies, they are transferred to the importers for disposition through normal retail channels. This assures importation of essential goods in sufficient quantities, a responsibility which Netherlands Indies firms, weakened by losses occasioned by war and the political situation, cannot afford to undertake without assistance from the Government. An American manufacturer desiring to sell his product in the Indies should contact established firms in that country, or their branch offices which most large prewar houses maintain in New York. He will then be informed whether any allocation for the purchase of his product is available and in what amounts.

HOT POTATOES

Seven thousand tons of potatoes destined for Italy in the Army's Civilian Relief Program are protected from freezing while being loaded by continuous hot air being pumped into the holds by Theg—a machine developed by Todd Shipyards Corporation. The spuds arrived at the pier in pre-heated trains and trucks and were in danger of freezing while being put aboard the ELKO VICTORY, a States Marine Corporation freighter. A steady temperature averaging 37° was maintained in all five holds of the ship while the outside temperature ranged from 0° to 18°. Potatoes freeze at 28.9°, and rot very quickly after thawing.

E. Russell Lutz, vice-president of American President Lines, was welcomed back from the maiden voyage of the President Cleveland by this petite blonde maiden, Virginia Phillips, who told him he had been chosen chairman of the 1948 Maritime Day celebration in San Francisco and vice-chairman of the World Trade Week committee.

Documents on Private Trade Shipments to Japan

All freight and air express shipments to Japan require, in addition to customary prewar documentation, evidence of SCAP authorization. The evidence for usual commercial shipments made to Boeki Cho must be in the form of a contract validated by SCAP. On other shipments, such as imports by licensees, private individuals, and occupation personnel, evidence of clearence by SCAP is necessary. Four complete sets of all shipping documents are currently required. It is not necessary that goods be marked with country of origin. No documentation is required by SCAP on mail to Japan. At present mail shipments to Japan are limited to 18 ounce packages of samples and gift packages (relief parcels) not exceeding 22 pounds.

World Trade Exposition

In previous years, San Francisco's participation in National World Trade Week has been largely a financial district affair. This year, however, the World Trade Association has plans to make this event a city-wide celebration. A World Trade Exposition, in which foreign governments can display their wares and tell visitors about their tourist attractions, will be held in the Grand Nave on the second floor of San Francisco's famed Ferry Building. Added interest is given to this location for the

THE HOWLANDS (and Frank)

With the U. S. Commercial Company winding up its affairs, Frank Howland, Chief of their San Francisco office, has accepted the position of manager of the International Forwarding Department of the Oceanic Trading Company.

Sam and John Gazzano have made the Oceanic Trading Company an unusual unit in the world trade picture on the Pacific Coast. The scope of their lines and the activities in which they engage give them special opportunities for diversification of effort. Among these activities is the forwarding of relief packages to former war areas.

Born in San Francisco in 1904, Frank comes from a long line of seamen, beginning with John Howland who arrived in Plymouth in 1620 on the *Mayflower*, followed by his brothers on the *Fortune* (1621) and the *Arm* (1623). Most of their sons followed the sea until the Civil War, many of them becoming masters on whaling and clipper ships, travelling around the Horn to San Francisco and thence to the Pacific Islands and the Orient, returning to New Bedford with rich cargos for their trading companies.

In 1770 Isaac Howland founded a trading firm in New Bedford, Massachusetts, and his son, Isaac, Jr., built the firm into one of the largest and most prosperous firms ever to engage in the whaling industry.

Frank's grandfather, Benjamin Franklin Howland, first went to sea on a clipper ship of which his father was master, and later rose to be master of a clipper ship of his own. He retired from the sea at the age of 23 and settled in California, later becoming partner in a large hydraulic mine in Central California.

Frank's father, Henry Frank Howland, who was also born in San Francisco, served for fifty years in the shipping business. He was purser on the old *S/S China* and the *S/S Hongkong Maru* of the old China Mail and Toyo Kisen Kaisha Lines, freight clerk with the old Pacific Mail Steamship Company, and office manager of Williams, Dimond & Company. Finally he became associated with the American Hawaiian Steamship Company where he served for thirty years and became secretary to American Hawaiian President Roger Lapham.

In his new position Frank is maintaining the strong seagoing tradition in his family. His background includes 21 years with Mattoon & Company, custom house brokers and forwarding agents, three years as transportation and warehouse officer for the Pacific Coast for the Lend Lease Administration, and two years with the United States Commercial Company.

Below, left to right: John Gazzano, Frank Howland, and Sam Gazzano.

Marine Insurance

The London Letter

By Our United Kingdom Correspondent

Premium Rates Reduced too Soon

IN CONSIDERING the prospects of hull business in the year 1948, it should be mentioned that it has now become apparent that the concessions of the immediate postwar period were made prematurely. They were made in the belief that, with a return to normal navigational conditions and the resumption of private enterprise in shipowning, there would be a decline in settlements. This has not proved to have been the case. The anticipated falling-off in the number of casualties has failed to materialize; instead, casualties have increased very materially in number, as the monthly returns of the Liverpool Underwriters' Association have proved beyond doubt.

Another important factor in this connection is that, whereas underwriters quite justifiably anticipated that the cost of repairs would decline from the wartime peak, there has been, if anything, an increase in the cost of repairs. Great credit is due to underwriters for making reductions in premiums immediately after hostilities ceased. Now, however, it is becoming clear that, in implementing their pledge to make those reductions, they erred on the side of generosity.

International Competition In Insurance is Desirable

Demands by some nations to seek to favour their national insurance industry by freezing out foreign competition goes on. This is in spite of warnings from many quarters that only ill can result from this narrowing tendency. By closing their marine insurance frontiers, these nations prejudice their own overseas trade and invite possible catastrophe in their own insurance industries. The theory behind the actions of these nationalistic legislators is that in recent years marine underwriters have made large profits. They believe that, if they can prevent premiums from being exported to other countries, their own insurance industry must benefit. They do not perceive that, if they create a national monopoly of marine insurance, their own merchants and shippers will be at the mercy of their own underwriters, and that, while they keep their national premiums in the country, the money paid in premiums circulates in a very narraw circle. They cannot see that, without competition from abroad, their export trade can be victimised by an insurance industry that must rely, to a very great extent, upon its own resources, and cannot, therefore, do business except at rates which virtually guarantee a profit.

The London Meeting

In the 64th annual meeting of the Institute of London Underwriters, Mr. Harold H. Mummery said that a matter which was giving a great deal of concern at the present time was the vast sums which underwriters in this country were being called upon to pay for claims due to theft and pilferage, and claims which could be contributed to indifferent and even bad packing. He suggested that the marine insurance market should reintroduce the Institution's "Shipping Value Theft, Pilferage and Non-Delivery" clause. By so doing, rightly or wrongly, he was left with the impression that "we should place upon the consignee a greater sense of responsibility to see that his goods are conveyed to their final destination with reasonable despatch, as provided for in the Institute 'Cargo Wartime Extension' clause."

Mr. Mummery reported with special pleasure that the American Institute of Marine Underwriters had decided to become a member of the International Union of Marine Insurance.

The Liverpool Meeting—Radar For Port Control

The Committee of the Liverpool Underwriters' Association in their report for the year 1947, just issued (this is the Association's 146th annual report), have compiled a document of several thousand words, reviewing the principal events of the past year. The Committee note with interest that the Mersey Docks and Harbour Board expect in 1948 to be the first Port Authority in the world to utilise Radar on a full scale basis for port control, "as a result of which a considerable acceleration in the turn round of ships will no doubt be achieved, quite apart from additional safety of navigation in the Mersey Channel during bad visibility."

Ship Losses Since the War

According to the Association's records, 45 steam or motor vessels, of 500 gross tons and upwards, totalling 173,484 gross tons, became casualties as a result of con-

(Please turn to page 106)

COAST GUARD GRADUATING OFFICERS

Included in this picture are those who, on February 12, were given the oath of office as regular commissioned officers of the U. S. Coast Guard by Rear Admiral W. K. Scammel in the Appraisers' Building, San Francisco.

Some of the group were Reserve Officers and former members of the Department of Commerce before the Coast Guard assumed charge of the Inspection Bureau. Others were regular Coast Guard officers with temporary appointments, who received permanent commissions.

The Bureau of Inspection is headed up by Capt. J. P. Tibbetts and H. V. Barbieri, who work directly under Chief of Staff Capt. Charles W. Dean, who in the absence of Admiral Scammel is Commander of the Coast Guard District.

And for a top notch information officer you contact Chief Yeoman R. G. Degnan.

Those pictured are the following:

Comdr. Frederick A. MacGurn, USCG; Lt. Comdr. Carl H. Carlsen, USCG; Lt. Comdr. Charles V. Carson, USCG; Lt. Comdr. Felix S. DeSoboll, USCG; Lt. Comdr. Jesse E. Eastman, USCG; Lt. Comdr. George C. Ferenz, USCG; Lt. Comdr. Barney Frankel, USCG; Lt. Comdr. David S. Garvis, USCG; Lt. Comdr. Otto V. Knierim, USCG; Lt. Comdr. Samuel J. Miller, USCG; Lt. Comdr. George J. Monteverdi, USCG; Lt. Comdr. Peter Olson, USCG; Lt. Comdr. Charles C. Plummer, USCG; Lt. Comdr. Cortlandt W. Quinby, USCG; Lt. Comdr. Frederick A. Reicker, USCG; Lt. Comdr. Frank N. Sampson, USCG; Lt. Comdr. George W. Stedman, Jr., USCG; Lt. Comdr. Herbert J. Stevens, USCG; Lt. Comdr. Jesse O. Thompson, USCG; Lt. Comdr. Andrew M. Thomsen, USCG; Lt. Comdr. Bertram J. Tuckey, USCG; Lt. Comdr. Arthur M. Vrooman, USCG; Lt. Comdr. Lucius E. Wadman, USCG; Lt. Comdr. Leonard C. Walen, USCG; Lt. Comdr. Stuart H. Waring, USCG; Lt. Comdr. William A. Williamson, USCG; Lt. Comdr. Arthur S. Whitehead, USCG; Lt. Norman A. Dreher, USCG; Lt. (jg) William M. Benkert, USCG; Lt. Bainbridge B. Leland, USCG; Lt. Comdr. Samuel G. Guill, USCG; Lt. Comdr. Lance J. Kirstine, USCG; Lt. Charles E. Norton, USCG; Lt. (jg) Ricardo A. Ratti, USCG.

Admiralty Decisions

By HAROLD S. DOBBS *of San Francisco Bar*

SHIP COLLISION

EVERY ONCE IN A WHILE I come across an interesting case of collision at sea that I feel would be of particular interest to my readers, although under ordinary circumstances I rarely devote very much copy to the subject of collision.

A most interesting case that was decided a number of years ago was that of *Northern Navigation Company vs. Minnesota-Atlantic Transit Company*. The case was heard on appeal by each circuit of the United States Circuit Court of Appeals. The case is particularly important from the standpoint of the rules with respect to overtaking a vessel at sea.

On a bright summer afternoon in August the Steamer *King*, a salt water type, blunt bowed freighter, 251 ft. long, 43.5 ft. beam, and with a draft of 16.5 ft. forward and 17.5 ft. aft, backed out of Slip 3 on the north shore of the harbor at Duluth ship canal about 3,000 ft. to the east. At about the same time the steamer *Noronic*, a fine lined passenger boat, 385 ft. long, with a draft of 9 ft. forward and 18 ft. aft, backed out of Slip No. 1, about 600 feet east of Slip No. 3, and started for the same ship canal. This ship canal was 300 feet wide, 22.9 feet deep and about 1400 feet long connecting the Duluth Harbor with Lake Superior. There were cement retaining walls on each side of the canal. At the west end of the canal the cement retaining walls continued as piers but curved to the north and south to form an approach to the canal, and the width of the entrance at the extreme west end of the piers was some 500 feet. On the west end of the cement retaining walls and just before the walls continued as piers, or curved for the entrance, is an aerial bridge. At the time the boats arrived at this aerial bridge the stem of the *Noronic* was ahead of the stem of the *King*, the latter lapping the port quarter of the *Noronic* some 75 to 100 feet. After the two boats had just passed the aerial bridge their sterns were abreast and the suction from the *Noronic* pulled the stern of the *King* toward the stern of the *Noronic* and caused the *King* to veer into the cement wall on its left or port side inflicting considerable damage. The foregoing facts are the only facts in the record upon which there is no dispute. As to which steamer was in the lead after they had straightened out for the canal and as to the relative positions of the two vessels between that time and their arrival at the aerial bridge in the canal there is an irreconcilable conflict in the evidence, or an entire lack of evidence.

Both vessels backed out of their respective slips and in maneuvering backed to port and each laid their respective courses for the ship canal. From the evidence they were in general traveling at about the same speed. The story as told by the witnesses for the *Noronic* is substantially as follows: that as the *Noronic* was backing out of its slip the *King* was observed backing out of its slip some 600 feet further west, that as the *Noronic* straightened out and laid its course for the canal entrance the *King* was finishing a like maneuver and was astern and to the starboard of the *Noronic*, later crossing the stern to port and at all times until entering the canal proper was astern of the *Noronic*; that at about the time they entered the pierheads of the canal the *King* endeavored to pass the *Noronic* resulting in the positions of the two vessels as above recited and the subsequent damage to the *King*.

The story on behalf of the *King* in substance is that the *King* had backed out of its slip and was proceeding towards the canal going forward when the *Noronic* gave notice by a whistle that it was about to back out of its slip; the *King* then gave one short whistle indicating that it would pass to starboard of the *Noronic* and for the *Noronic* to remain in its berth; this signal was not answered by the *Noronic* which at once proceeded to back out into the harbor whereupon the *King* was required to stop its engines and wait while the *Noronic* backed across its bow and that as soon as the stem of the *Noronic* cleared, the *King* proceeded, passing the *Noronic* on the later's port side while it was maneuvering to straighten out for the canal, and the *King* was in front of the *Noronic* at all times thereafter until just as it was reaching the pierheads of the canal the *Noronic*, coming up fast from behind, endeavored to pass it, resulting in the position of the vessels and the subsequent damage to the King as above narrated.

The Minnesota Atlantic Transit Company was the charterer of the *King* and as libellant brought this action against the *Noronic* owned by the Northern Navigation Company. The trial court found that the damage caused to the libellant's steamer *King* was occasioned solely by the negligence of the respondent's steamer *Noronic* and without any fault on the part of the said *King* and rendered judgment in favor of the libellant for the entire damage sustained by the *King*.

As both vessels were outward bound and each started on its course at about the same time the stage was all set for a controversy to arise as to which one was entitled to go through the canal first. Evidence on behalf of the *King* was directed principally to the question of which one had the lead after the two vessels straightened out and fixed their courses for the canal, while the evidence for the *Noronic* was principally directed to the question of which vessel arrived first at the canal piers.

The trial court on this important question determined that after the two ships had rounded to and were on defined courses, the *King* was the overtaken and the *Noronic* the overtaking vessel. There is no claim that the *Noronic* gave any signal to the *King* that it intended to pass the *King* and under this situation it is clear that the *Noronic* at no time had the right to pass the *King* without its permission, which, it is conceded, was never asked for or given.

The following rules govern the navigation of vessels in harbors and inland waters generally:

"When steam vessels are running in the same direction, and the vessel which is astern shall desire to pass on the right or starboard hand of the vessel ahead, she shall give one short blast of the steam whistle,* * *" Rule VIII, 33 Mason's U. S. C., 203.

"Notwithstanding anything contained in these rules every vessel, overtaking any other, shall keep out of the way of the overtaken vessel.

"Every vessel coming up with another vessel from any direction more than two points abaft her beam, * * * shall be deemed to be an overtaking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear. * * *" 33 Mason's U.S.C., 209.

"Where, by any of these rules, one of the two vessels is to keep out of the way, the other shall keep her course and speed." 33 Mason's U.S.C., 206.

"Every steam vessel which is directed by these rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed or stop or reverse." 33 Mason's U.S.C., 208.

"In all channels less than five hundred feet in width, no steam vessel shall pass another coming in the same direction unless the steam vessel ahead be disabled or signify her willingness that the steam vessel astern shall pass, when the steam vessel astern

(Please turn to page 106)

--With The

On pages 76 and 77 of this issue appears a roster of members and officers of the Society of Port Engineers, San Francisco, for which many requests have been received.

The Society is considering certain revisions in its constitution, and upon approval, they will be published in this section of the *Pacific Marine Review.*

Vincent E. Foell

Port Engineer of the Month

SAN FRANCISCO

Vincent E. Foell

Of United States Lines

Now Port Engineer for United States Lines, Vincent Foell has had an extensive career in marine engineering and marine transportation. Born in Syracuse, N. Y. in 1919, Vincent graduated from the Engineering Department of the New York State Merchant Marine Academy. He held various engineering positions on United States Lines Company steam and diesel vessels, and was Assistant Port Engineer for United States Lines and the Pacific Far East Line prior to his present position with United States Lines.

In World War II he was awarded the Merchant Marine Citation for action against the enemy and the Merchant Marine Bar for service in the Pacific area. Vincent is a member of the Board of Governors of the San Francisco Society of Port Engineers and a member of the United States Naval Reserve.

Change of Presidents At Los Angeles Society

Left, Joe Wosser, Matson Navigation Company, newly elected president of the Los Angeles Society of Port Engineers, shaking hands with Len Landers, American President Lines, outgoing president.

Port Engineers -

A roster of members of the Los Angeles Society of Port Engineers is at hand and will be published in the April issue of *Pacific Marine Review.*

At Annual Meeting of Los Angeles Society

At the speaker's table (top picture), left to right: M. D. Jayred, Republic Supply Company of Calif.; Edwin H. Price (Speaker), Manning, Maxwell & Moore, Inc.; Len Landers, American President Lines; Burt Hale (Secretary), Marine Solvents Corp.; Dick Park, Republic Supply Company of Calif.

Below, left to right: Burt Hale, Dick Park, Dan Dobler (Chairman of Board) Texas Company; Joe Hare, U.S.M.C.; Harry Summers, American Bureau of Shipping.

William Billings

Port Engineer of The Month

SAN FRANCISCO

William Billings of Pope & Talbot Lines

Like the proverbial mail-carrier who takes a walk on his days off, William H. Billings, smiling, carefree Assistant Port Engineer of Pope & Talbot Lines, likes to spend his spare time around the water. "Bill" Billings, who is ever alert in supervising engine repairs on the company's ships at San Francisco, is always good for a "bass story" to ease the tension when things are in a turmoil.

With a long record of achievement behind him, Bill is happy that he can be with his family in his home at Oakland. His two fine, growing sons often accompany him on his trips to the fishing grounds.

Billings came up the hard way. After serving a stern apprenticeship with General Electric Company he took off to sea to all the corners of the globe. In 1936 he was with Matson Navigation Company and after seven years he left them to be with Polarius Steamship Company in New York City where he was Superintending Engineer for about 18 months. He then joined Pope & Talbot Lines in 1945 as "chief" on the *Sea Blenny* and the same year was made Assistant Port Engineer for the same company in San Francisco.

And among the Governors of the Society of Port Engineers at San Francisco we find William H. Billings.

MEMBERSHIP ROSTER
SOCIETY OF PORT ENGINEERS
SAN FRANCISCO

James R. Anderson (A)	U. S. A. T.	Building 201, Fort Mason, Calif.
Joseph J. Anderson (A)	Luckenback Steamship Co.	100 Bush St., San Francisco, 4
Henry Andrews	Westinghouse Electric Corp.	1 Montgomery St., San Francisco, 4
Charles R. Angell, Jr.		1332 El Camino Real, Burlingame
Milo M. Atkinson		110 Market St., San Francisco
Ray E. Baker (A), Port Engineer	Richmond-San Rafael Ferry Co.	P. O. Box 1126, Richmond, Calif.
W. H. Billings (A), Asst. Port Engineer	Pope & Talbot, Inc.	320 California St., San Francisco, 4
George Barr	General Electric Co.	235 Montgomery St., San Francisco, 4
W. C. Blake, Vice President	Triple A. Machine Shop	Pier 62, San Francisco
Colin Branford (A), Port Engineer	Shepard Steamship Corp.	New Orleans
R. E. Burness	Standard Oil of Calif.	7th & Irwin Sts., San Francisco
E. P. Butler	Gamlen Marine Service	150 Vermont St., San Francisco
Ira B. Chapman (A), Asst. Port Engineer	American President Lines, Ltd.	Pier 42, San Francisco, 7
John Clerico (A), Supt. Engineer	Pope & Talbot, Inc.	320 California St., San Francisco, 4
John R. Cook	Brown-Bevis Equipment Co.	4900 Santa Fe Ave., Los Angeles, 11
Fred D. Deckard (A), Port Engineer	Sabine Oil Co.	
Louis A. Deppman (A), Port Engineer	Sudden & Christenson, Inc.	310 Sansome St., San Francisco, 4
Donald W. Deeds, Engineer	U. S. A. T. S.	Fort Mason, Calif.
Wm. De Wijn, Port Engineer	Java-China-Japan Line	149 California St., San Francisco, 4
Douglas E. Dickie, Serv. Engineer	Foster-Wheeler Corp.	206 Sansome St., San Francisco, 4
Andrew C. Disher (A), Ch. Tech. Insp.	U. S. A. T. S.	Building 201, Fort Mason, Calif.
Franklin H. Drew	Westinghouse Electric Corp.	1 Montgomery St., San Francisco, 4
George W. Duncan	U. S. A. T. S.	Dock No. 1, Fort Mason, Calif.
A. J. Ederer (A), Port Engineer	Pacific Transport Lines	240 California St., San Francisco, 11
J. E. Edwards	U. S. A. T.	Fort Mason, Calif.
Rodney M. Elder (A), Asst. Port Engineer	Pacific Tankers, Inc.	233 Sansome St., San Francisco, 4
B. R. Emery (A)	W. R. Chamberlin	465 California St., San Francisco, 4
John Faville	Pier 1, Marine Repair Shop	Foot of Laguna St., Fort Mason, Calif.
Tom Finn	United Amer. Metal Corp.	785 Bryant St., San Francisco, 7
Vincent E. Foell (A), Port Engineer	United States Lines	222 Sansome St., San Francisco, 4
Frank Fox, V. P. and Ch. Engineer	General Engineering & DD Co.	1100 Sansome St., San Francisco, 11
James H. Frickie, Marine Surv.	Hart-Wood Lumber Co.	1 Drumm St., San Francisco, 11
Marshall T. J. Garlinger (A), Asst. to Supt.	U. S. A. T.	Fort Mason, Calif.
Joseph F. Gisler	444 Board of Trade Building	San Francisco, 11
William Gough (A)	Parry Navigation Co., Inc.	100 Pine St., San Francisco, 11
E. J. Graff (A), Port Engineer	Grace Line	2 Pine St., San Francisco, 11
George H. Harlan (A), Asst. to Supt. Engr.	U. S. A. T.	Fort Mason, Calif.
John A. Harris	U. S. A. T.	Dock No. 1, Fort Mason, Calif.
Sam Hawkins	The Log	40 First St., San Francisco
Q. D. Higgins (A)		2690 - 38th Ave., San Francisco, 16
H. T. Hill		735 - 46th St., Oakland 9, Calif.
W. B. Hill	C. C. Moore & Co.	450 Mission St., San Francisco, 5
William C. Hodges (A)	U. S. A. T.	Building 201, Fort Mason, Calif.
George Hoxie, Asst. Port Engineer	American President Lines	311 California St., San Francisco
W. J. Jenders, Chief Engineer	U. S. A. T. "Admiral Sims"	Building 201, Rm. 110, Fort Mason
M. A. Johnson (A), Port Engineer	Olympic Steamship Co.	Pier 57, Seattle, Wash.
Lynton Jordan (A), Asst. Port Engineer	Pacific Tankers, Inc.	233 Sansome St., San Francisco, 4
J. G. Kelly (A), Port Engineer	W. R. Chamberlin Co.	465 California St., San Francisco, 4

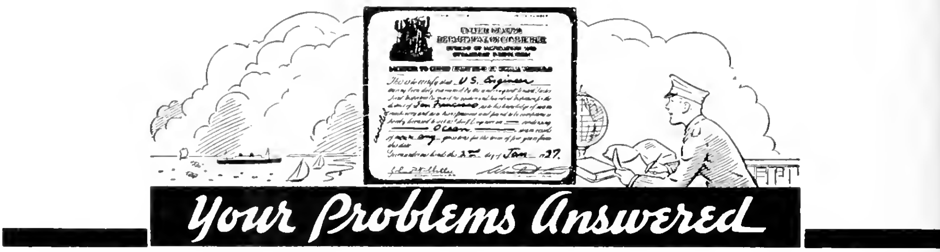
Lee Kincaid	U. S. A. T. Service	330 Baltimore St., Larkspur, Calif.
Thomas Klitgaard, Marine Inspector	U. S. A. T. Water Division	Building 201, Rm. 220, Fort Mason
Alex W. Kyle (A), Asst. Port Engineer	American President Lines, Ltd.	Pier 42, San Francisco, 7
John W. Laine (A), Asst. Port Engineer	American Hawaiian S. S. Co.	Pier 28, San Francisco
H. C. Lauer, Inspector	U. S. A. T.	Building 201, Fort Mason, Calif.
Joseph J. Lewis	E. F. Drew & Co., Inc.	440 Golden Gate Ave., San Francisco, 2
George H. Lienhard, Serv. & Sales Engr.	Nordberg Manufacturing Co.	674 Harrison St., San Francisco
T. Douglas MacMullen, Editor	Pacific Marine Review	500 Sansome St., San Francisco, 11
H. Martin (A), Port Engineer	Moore-McCormack Lines	140 California St., San Francisco, 11
Chester E. McKay (A), Supt. Engineer	Overseas Tankship Corp.	551 Fifth Ave., New York City
George Miller	Pacific Tankers, Inc.	233 Sansome St., San Francisco, 4
Leigh Miller	U. S. A. T.	Fort Mason, Calif.
Harry I. Morrison	U. S. A. T.	Building 310, Fort Mason, Calif.
Jesse F. Neel	General Petroleum Corp.	417 Montgomery St., San Francisco, 4
Winslow Nott	Thomas A. Short Co.	245 Fremont St., San Francisco, 5
James Persons Paine (A)	American President Lines	Pier 44, San Francisco
R. N. Parkin, Supt. Engineer	Westinghouuse Electric Corp.	410 Bush St., San Francisco, 8
John A. Philip	U. S. A. T.	Building 201, Fort Mason, Calif
Alfred Pittman	Hagan Corporation	149 California St., San Francisco, 11
Ralph S. Randall (A), Asst. Port Engineer	Sudden & Christenson, Inc.	310 Sansome St., San Francisco, 4
Larry Rapp	C. C. Moore & Co.	450 Mission St., San Francisco, 5
Wilbert H. Reich (A)	Grace Lines	Pier 37, San Francisco
James A. Riemers (A)		112 Market St., San Francisco
W. A. Riley, Sales Engineer	Republic Electric Co.	33 Drumm St., San Francisco, 11
Perry D. Roach (A), Asst. Port Engineer		1940 Washington St., San Francisco, 9
Arthur R. Robertson	Westinghouse Electric Co.	410 Bush St., San Francisco, 4
Alfred T. Rogers		112 Market St., Rm. 308, San Francisco
W. L. Russon	U. S. A. T.	Fort Mason, Calif.
Ray H. Sample (A)	Matson Navigation Co., Pier 32	Embarcadero, San Francisco, 5
Sylvester W. Simon (A)	Pacific Far East Line	141 Battery St., San Francisco, 11
W. E. Sizemore (A)	U. S. A. T.	Building 201, Fort Mason, Calif.
Frank W. Smith (A), Port Engineer	American Mail Line	369 Pine St., San Francisco, 4
William Starck (A), Asst. to Supt. Engr.	U. S. A. T.	Fort Mason, Calif.
J. A. Stasek (A)	Pacific Far East Line, Inc.	Pier 45-A, Embarcadero, San Francisco
H. A. Steiner (A), Port Engineer	Pacific Far East Line, Inc.	141 Battery St., San Francisco, 11
Bob Streiff (A), Asst. Port Engineer	Pacific Tankers, Inc.	233 Sansome St., San Francisco, 4
P. H. Thearle (A), Supt. Marine Engr.	Army Transportation Corps	S. F. P. E., Fort Mason, Calif.
Harry Thompson (A), Port Engineer	Shepard Steamship Corp.	369 Pine St., San Francisco, 4
B. R. White	Bird Archer Co. of Calif.	19 Fremont St., San Francisco, 5
George Voyer (A) Asst. Port Engineer	Coastwise Lines	222 Sansome St., San Francisco, 4
Bill Williams	U. S. A. T.	Fort Mason, Calif.
E. H. Williams (A), Port Engineer	United Fruit Company	1001 Fourth St., San Francisco, 7
A. E. Wion	Grace Line	2 Pine St., San Francisco, 11
M. C. Wright (A)	Deconhill Shipping	311 California St., San Francisco, 4
Harold J. Wrigley	International Paint Co., Inc.	901 Minnesota St., San Francisco, 7
J. Zuboff (A)	U. S. A. T.	Building 201, Fort Mason, Calif.

1948 OFFICERS

President—P. H. Thearle | Vice-President—M. C. Wright | Secretary-Treasurer—J. A. Riemers

MEMBERS OF THE BOARD OF GOVERNORS

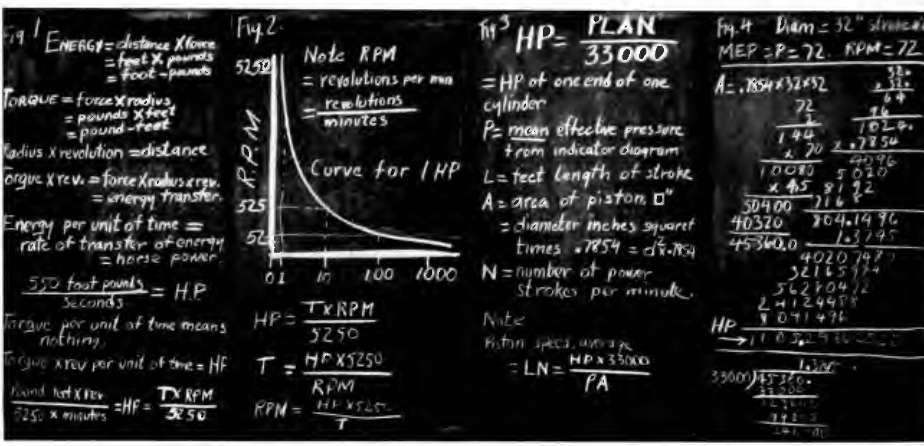
J. F. Gisler, Chairman
H. J. Wrigley
Marshall T. J. Garlinger
J. W. Laine
Bob Streiff
R. H. Sample
E. J. Graff
Harry Thompson
F. W. Smith
W. H. Billings
V. E. Foell
I. B. Chapman
C. E. McKay



by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

"CHALK TALKS" ON APPLIED MATHEMATICS



Blackboard figures 1 to 4 mentioned in the text.

Ratings and Limitations of Reciprocating Engines

In the February issue we discussed the horsepower and its mathematical derivation and furthermore introduced the conception of torque or twisting effort. It was brought out that energy or work done is measured in foot-pounds and that torque is measured in pound-feet. These two units are not the same, as is developed in Fig. 1. The corresponding horsepower conversion factors are different. The foot in one case is the distance through which a force is moved and in the other case the foot is a radius and does not become a distance through which a force is moved until multiplied by revolutions per minute or second.

Note that the horsepower capacity of an engine, or any machine for that matter, is the product of the torque and the speed, and a multiplying constant number to adjust the units used. See Fig. 2. Here the curve represents one horsepower. All the figures could be multiplied by 100 for a 100 hp curve or by 10,000 for a 10,000 hp curve. For a given size of engine in hp the higher the speed the lower the forces such as torque,

piston load and so on. But centrifugal force increases and acts as a limit to speed. With reciprocating engines it is the piston speed and the forces of reversing the piston that limit the speed long before the centrifugal force limits it. If we can control centrifugal force by special designs, close safety factors, high test alloy steels and all, we can speed up the turbine and obtain tremendous ratings out of a light weight. The gas turbine driving the super charger of the modern airplane may be rated 500 hp yet be no larger than a straw hat but it may run up to perhaps 17,000 revolutions per minute, which, using these figures, gives us only 15 pound feet torque, a value which you could easily set up with a 10 inch Crescent wrench. The gas turbine in the axial flow turbo-jet aircraft engine may deliver as much as 15,000 to 30,000 hp to the direct connected air compressor and yet be only single stage, 3 to 4 feet in diameter, and perhaps 11,000 rpm. At the other end of the scale at slow speeds we may have very high torques which means large shafts and great weights. Thus as we increase speed we reduce the weight per hp or increase the hp per pound weight. A good figure to remember is the one pound of weight per hp which can just about be achieved in the aircraft reciprocating engine. Contrast this to the hundreds of pounds per hp of the slow speed reciprocating marine steam engine. But then again we may largely lose the light weight features of high speed engines if the load cannot take the power at a high speed, as reduction gears must be used. Development of precision-cut gears in the last 30 years has permitted us to use the turbine at a fairly high speed aboard ship but we still would like to run the turbines at a speed which is more than a reasonable gear reduction and propeller speed will permit. Turbine designers would like to reduce weights and increase speeds much above those values in common use today but the gears and gear ratios force them to a compromise with the best they could do with the turbine only.

Fig. 3 shows that the piston speed of the reciprocating engine may be taken as the product of the length of the stroke in feet and the number of strokes per minute. A favorite problem in the Coast Guard examination for the higher rates is to calculate the piston speed of an engine when the indicated hp is given and the piston diameter in inches is given. This puzzles most engineers because no mention of speed and rpm is made nor is the length of the stroke indicated. But as shown, knowing only the hp of the cylinder as indicated, and the piston diameter, the average piston speed can be calculated. Note carefully that this is an average speed of the piston and that with the crank at the horizontal point the speed is much higher. Sometime in the future we will discuss the mathematics of the calculation of the maximum speed.

We have promised to work a problem in the calculation of the hp of an engine. Ordinarily we do not give examples of the arithmatic of the problems in mathematics we cover, as we would like to accustom the engineers to thinking of these things in the symbolic terms of algebra. Unless the engineer is puzzled a little by the written text and has the courage to dig it out to an understanding there is little profit in reading except as an amusement.

Fig. 4 is the solution to the problem in the Coast Guard blue book of specimen examinations (page 37) for 3rd assistant engineers. The problem is: A steam cylinder is 32 inches diameter, the stroke of the piston is 4 feet 6 inches, the mean effective pressure is 70 pounds per square inch, revolutions per minute 72. Find the horse power.

Several comments are necessary. If this were for higher ratings quite likely the diameter of the piston rod would be given, as the area of the rod must be subtracted from that of the piston in calculating the hp of the crank end of the engine. The mean effective pressure of the two ends would usually be slightly different as the valves would be a little off an exactly symmetrical position so that the weight of the piston is carried by the steam load. Thus for two reasons the hp of the two ends of the piston are different, different effective areas and different pressures. If not so stated it is customary and nearly correct to assume the same hp at each end. Thus in Fig. 4 we multiply the rpm by 2.

The first thing to do is calculate the area. Using the constant .7854, which we developed in this column some time ago, we square the diameter and multiply. In actual practice we would take the area as 804.15 but the examiners want to see how we handle our arithmatic and ask to see the problems carried out to at least four places beyond the decimal point. See Fig. 4. Then comes the PLAN formula and more multiplications. Multiplications may be carried out in any order we choose, and we usually multiply all the simple numbers together first. The 72, the 2, the 70, and the 4.5 give us 45360.0. We divide this by the 33000 as it seems easiest, and then are ready for the long multiplication. Thus we end up with the answer shown, which in actual practice we would call 1105 hp.

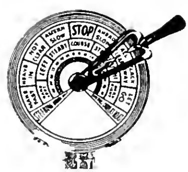
Our next article will discuss the imporance of the gear ratio in applying engines to ships, automobiles and locomotives, as this is a logical question after explaining that we need only to increase the speed to increase the hp of any engine.

Crew Crush Crowds Customers

American ocean liners would be forced to have 20% more crew members than passengers if maritime unions obtain a 40-hour week at sea. Under a four-watch system, necessary for a 40-hour week, the *America's* crew would expand from 687 to 997, and in order to secure quarters for these extra men, the passenger capacity would be reduced from 1050 to 792. Under such circumstances, the *America* would have to compete with Britain's *Queen Elizabeth*, the latter having a crew of only 1,280 for 2,314 passengers. In other words, the *Queen*, with only 283 more men in her crew, would be able to attend to the wants of 1,522 more passengers than the *America*.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

THE MAGNETIC COMPASS

(Continued)

Practical Compensation

IN THE THREE preceding issues this column has been working toward this final discussion on Practical Compass Compensation. We have discussed—First, The Parts of the Compass and Binnacle; Second, The Effect of the Earth's Magnetism on the Vessel's Hard Iron or Semicircular Deviation due to Sub Permanent Magnetism of the Vessel; and Third, The Effect of the Earth's Magnetism on the Soft Iron of the Vessel or Semicircular Deviation due to Transient Magnetism in Vertical Soft Iron, Quadrantal Deviation due to Transient Magnetism in Horizontal Soft Iron and Heeling Error.

Now, we are ready to put into practice the knowledge gained in the previous articles. It is well to break down the Practical Compensation into three catagories—1. Preparatory Steps, 2. Preliminary Steps, and 3. Compensating Steps. After listing each of the steps of the three categories, we will take each step separately and explain it.

1. Preparatory Steps

(a) See that vessel is on an even keel.

(b) See that all movable masses (booms, etc.) are secured in the position they will normally occupy at sea, and that no unusual magnetic masses are left lying about in the vicinity of the compass.

(c) See that there are no bubbles in the compass.

(d) Test compass for sensibility and moment of the compass card.

(e) See that binnacle is centered on, and aligned with, the midship line of the vessel and solidly secured.

(f) See that the compass is centered and secured in the binnacle and that there is no slack in the gimbal arrangement.

(g) See that the lubbers lines are in the fore and aft plane of the vessel.

(h) Test for residual magnetism in the Quadrantal spheres.

(i) Test for residual magnetism in the flinders bars.

2. Preliminary Steps

(a) Place Quadrantal spheres by estimate.

(b) Place heeling magnet, Red end up in North magnetic latitudes and drop to bottom of tube.

(c) Remove all but approximately ten degrees of deviation while on an East Magnetic heading by means of the Flinders Bar. If less than ten degrees deviation exists when on an Easterly heading do not place the Flinders Bar at this time.

3. Compensating Steps

(a) Head East and remove all deviation.

(b) Head North and remove all deviation.

(c) Head Northeast and remove all deviation.

(d) Head West and remove half the remaining deviation.

(e) Head South and remove half the remaining deviation.

(f) Head Southeast and remove half the remaining deviation.

(g) Head North, List Ship, and remove all deviation.

(h) Secure deviation.

(i) Swing ship for residuals.

(j) Construct deviation table.

It will be noted that perhaps in this breakdown of the steps, more steps are listed than will be found in the treatment of this subject by most authorities. The reason for this is simplicity and clarity. Authorities often group together steps which are listed here separately.

EXPLANATION OF STEPS

Now let us go over the above listed steps individually for a more complete explanation of each.

1. Preparatory Steps

(a) *Even Keel.* In order for the different components of the Earth's total force to have their normal effects on their respective components of the vessel's magnetic materials, the vessel must be on an even keel while compensating. Otherwise when on an even keel the compass would be overcompensated in some phases and under compensated in others; so shift oil, water or cargo until the Inclinometers or draft markings show that she is on an even keel.

(b) *Movable Masses Secured in Normal Position.* The movable masses of magnetic material must be in the position they will normally occupy under normal operating conditions at sea; that is, the booms cradled, topped or suared as is customary for that particular vessel on its own particular run when at sea, pontoon hatch covers in place and no magnetic masses near the compass which are not normally required to be there.

(c) *Check for Air Bubbles in Compass Bowl.* If bubbles are present and are small, distilled water may be used to refill bowl. If bubbles are large a solution of 45% grain alcohol and 55% distilled water should be used and compass should be checked very thoroughly for leaks.

Procedure for filling: Place compass on its side with filler plug on top, unscrew filler plug and fill using a small funnel which will allow air to pass out the filler plug hole beside the funnel. When only a small bubble remains, use a medicine dropper and have the end of the dropper in the liquid inside the compass bowl before squeezing the bulb. When all of the

bubble is out of the bowl, fill the filler plug hole level full, then dip the filler plug screw in the solution and remove so that a drop of the solution will cling by capillary attraction to the end of the filler plug screw. Then carefully and slowly place the filler plug screw in the filler hole so that the solution on the end of the plug marries with the solution in the bowl. Then screw the plug in and set it up tight. The care indicated in this last step is necessary in order to insure against having a small bubble remain in the bowl after filling.

(d) *The Test for Sensibility and Moment of the Compass Card* must be done at a place where there is no influence from magnetic masses, on the beach somewhere. To *test* for *influence* of *magnetic masses*, set up the compass and about 50 yards from it, set up a staff. Take bearing of the staff. If this bearing is the exact reciprocal of the first bearing, there is no magnetic influence; if the bearing is not reciprocal, then choose another location and repeat the above process.

Test for Sensibility by placing the lubbers line on the 0 mark of the compass card. Then gently draw the card 2° to the right with a magnet and allow to return and carefully note the exact reading (use a magnifying glass) at the lubbers line. Repeat the procedure to the left. If the card does not return to the 0° mark, there is something wrong with the compass.

Test for Moment by drawing the card 15° to the right then removing magnet and starting a stop watch the instant the 0° mark of the card swings past the lubbers line and stopping the stop watch the instant the 0° mark swings past in the opposite direction. Repeat this procedure, drawing the card 15° to the left. Compare the times. They should be the same. The time required for a 7½ inch compass to swing past and return, at the temperatures listed below, should be the number of seconds listed below the temperatures.

Fahrenheit Temperature:	100°	90°	80°	70°	60°	50°	40°	30°
Seconds:	13s	14s	15s	16s	17s	18s	20s	22s

In cases where the 0° on the card fails to pass the lubbers line the second time, there is an indication of week magnets, a cracked jewel in the cap or a worn or blunt pivot point.

Both the liquid in the bowl and the compass card must be at complete rest before the beginning of each observation of these tests.

(e & f) *Binnacle Centered on Midship Line of Vessel and Compass Centered in Binnacle.* It is well to consider steps e and f together to simplify the operation.

Check the heeling magnet tube for being centered in the binnacle by measuring.

Place compass in binnacle and check for center by raising and lowering the heeling magnet with the vessel on a north or south heading. If compass card moves, adjust the compass in the binnacle until no movement is noticed by means of the adjusting screws in the gimbal arrangement. Then lock the compass in position by setting up on the lock nuts of the adjusting screws. Now check to see that binnacle is on center line of vessel. This may be done by sighting (with sight vanes mounted on compass) on a predetermined centerline point at some distance forward and aft of the binnacle. The determining of these points may be done by using a tape measure to find the center line on deck and then if necessary, a plumb-bob to transfer the center point to the mast.

Check to see that there is no slack in the gimbal arrangement: that is, no fore and aft or athwartship movement of the compass.

(g) *The Lubbers Line* may be checked to see that it is in the fore and aft plane of the vessel, while checking to see that the binnacle is centered by comparing the alignment of your sight vanes with the lubbed line.

(h) *Test Quadrantal Spheres*

Mount the spheres and move them as near in to the compass card as possible with the ship steady on the same heading, alongside the deck if possible.

One at a time, turn the spheres slowly and note the compass reading after the sphere has been turned 90° until each sphere makes a complete rotation.

If the reading of the compass changes over 45′ the sphere should be reannealed.

(i) *Test Flinders Bar* for residual magnetism.

Have ship's head steady on any heading but North or South, preferably East or West alongside dock. Note heading. Remove Flinders from holder and reinsert it with the opposite end up. If compass heading changes the Bar has residual magnetism.

To remove residual magnetism, hold the bar at right angles to the magnetic lines of force and strike sharply with a piece of hardwood, or the Bar may have to be reannealed.

2. PRELIMINARY STEPS

In order to correct for the most important factor contributing to error in the compass (that of semi-circular deviation) it is necessary that other factors which would affect the deviation be considered. Since there will be a certain amount of magnetism induced into the soft iron correctors by the permanent magnets used in compensation, and this induced magnetism will have a definite effect on the deviation, it is necessary that these correctors be in their approximate position before starting the actual compensation.

(a) *Place Quadrantal Spheres*

On any intercardinal heading if the deviation is greater than 12°, in all probability, 9 inch spheres will have to be used.

The table given below will help in estimating the distance from the compass the quadrantal spheres should be placed.

Deviation on any Intercardinal Hdg.	Distance of Spheres from Compass: 9 inch spheres	7 inch spheres
21°	11 inches	
12°	13 inches	11 inches
7½°	14½ inches	12 inches
3°		15 inches

Interpolation for deviations not listed in the table may be made for preliminary placing of Quadrantal Spheres.

(b) *Place Heeling Magnet*

The heeling magnet may now be placed red end up in North Magnetic Latitude unless knowledge of some factor which requires blue end up is available. Lower heeling magnet to the bottom of the tube unless it is known that it will be required in some other position.

(c) *Place Flinders Bar if Necessary*

Head East magnetic and check deviation. If no more than 10° deviation exists it will not be necessary to place Flinders Bar at this time.

If more than 10° deviation exists, remove all but 10° by means of the Flinders Bar by placing a sufficient length of bar in the holder, the remainder of the holder being filled with the wood filler blocks which must be on the bottom.

The inner case of the Flinders Bar holder is removable so as to facilitate the removal and replacement of Flinders Bar or filler blocks.

The Flinders Bar is the means by which part of the semi-circular deviation of Coefficient "B" is compensated, this part of the force being the induction of magnetism in the vertical soft iron of the ship, coefficient "B" being the combined fore and aft forces of induced magnetism in vertical soft iron and the fore and aft component of the vessel's sub-permanent magnetism when on East or West headings.

Semi-circular deviation, which is caused by magnetism, which is induced in vertical soft iron and compensated for by means of Flinders Bar changes with a change of magnetic latitude so that compensation for this force in one latitude is not satisfactory. Observation of deviation in at least two magnetic latitudes on the same heading are necessary in order to compute for the proper length of Flinders Bar to use.

3. COMPENSATING STEPS

(a) *Head East Magnetic* and compensate for semi-circular deviation, which is due to the fore and aft force of the sub-permanent magnetism of the vessel, or in other words, compensate for the remaining component of coefficient "B".

Remove all deviation by means of permanent compensating magnets placed in the fore and aft trays.

If compass shows Easterly deviation on Easterly heading, place the red end of the compensating magnets forward or vice versa.

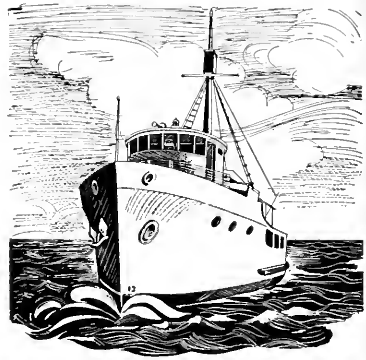
MEMORY AID: East on East Red 4

Easterly Deviation on East heading Red end forward. It is better (in order to avoid sluggishness of the compass) to place the magnets as far away from the compass as practicable. Use more magnets and keep them low in the magnet chamber.

(b) *Head North Magnetic* and compensate for Coefficient "C" or for semi-circular deviation, which is due to the athwartship forces of the sub-permanent magnetism of the vessel, by *removing all deviation* by the means of permanent compensat-

(Please turn to page 108)

Coast Commercial Craft



The Lucy Elena

Length, Overall	111′-3″
Molded Beam	25′-0″
Molded Depth	12′-9″
Molded Height to Raised Deck	19′-5″
Total Fish Capacity	195 tons
Brine Well Under Deck	168 tons
Brine Well on Deck	27 tons
Fuel Oil Capacity, Total	34,108 gallons
Cruising Range	12,000 miles
Fresh Water Capacity	3,860 gallons
Lubricating Oil Capacity	1,390 gallons

Specifications for Tuna Boat "LUCY ELENA"

Crews' Quarters:
- 1—8-man crew room.
- 1—2-man crew room.
- 1—Radio room with accommodations for 1 man.
- 1—Captain's room.
- 1—Engineer's room with accommodations for 2 men.

Refrigeration Compressors:
- 1—3½″ x 3½″, four-cylinder, 20 H. P. Machine,
- 2—5½″ x ½″, two-cylinder, 20 H. P. Machines.
- 1—2⅞″ x 2¼″, two-cylinder, 3 H. P. Machine for galley service.

The entire refrigeration system was designed and furnished by the Baker Ice Machine Company, Inc., of Los Angeles.

Main Engine:

Atlas 6-cylinder Imperial Diesel, single acting, direct reversible, 4-stroke cycle, 13″ x 16″, 315 RPM, supercharged to provide 550 BHP. The engine is equipped with a Kingsbury thrust bearing and is fresh-water cooled by means of heat exchangers.

Auxiliary Generating Engines:

Atlas 6-cylinder Imperial Diesels, 94 KVA, 220 volt, 3-phase, AC Electric Machinery Company Generators, direct-conected, 4-stroke cycle, 600 RPM, non-reversible, 112 BHP.

Pumps:
- 2—10″ Campbell vertical bait pumps.
- 11—2½″ Campbell brine circulating pumps with 2 H. P. Westinghouse Motors.
- 1—2″ Fairbanks-Morse fire pump 5 H. P. Fairbanks-Morse Motor.
- 1—3″ Carver brine transfer pump, with 5 H. P. Master Electric Company Motor.
- 1—3″ Campbell bilge pump with 3 H. P. Westinghouse Motor.

Electric Service:

220-volt, 3-phase, 60-cycle, AC electric power wherever required with 110-volt single phase, 60-cycle, AC lighting current throughout the ship.

Modern Oil Tanker Design

(Continued from page 62)

loft offsets, the net barrels per inch curve obtained therefrom having all deductions made for steel structure, piping, ladders, etc. These deductions amount to slightly less than one per cent of the gross volume. The preparation of the tables is a laborious and exacting task; the calibrations are usually given in 42 gal. barrels for increments of one inch for the total depth of the tank. Some owners require calibrations at one quarter inch increments, little realizing that the effects of list and trim discount such accuracy, and thereby make the preparation of the tables even more of a mathematical exercise.

Hull Construction

In general the tanker is characterized by the "three island" type of construction (Poop, Bridge and Forecastle) and machinery located aft. The forecastle and the poop enclosure of machinery casings are compulsory requirements for tankers by the Load Line Act. The relative compactness of modern machinery admits of a shorter machinery space, and the cubic thus gained can be utilized for cargo tanks. The effect on the center of gravity of the cargo is to move it further aft, and as a result the displacement may be distributed to a better advantage. It must be remembered, however, that it is essential to obtain the 32 per cent reduction in tonnage admeasurement for the machinery space; therefore its volume must not be reduced below rule requirements in order to effect this end.

The merchant type of cruiser stern, fitted with some form of stream-lined rudder is accepted practice. The design of the bow is open to two schools of thought: one favoring the normal form and the other the bulbous bow. Although the majority of tankers operate at speed-length ratios for which Taylor claims little or no benefit for the bulb, model tests show some decrease in horsepower as compared with normal forms for both the load and ballast cases.

The bulbous bow permits a fining of the entrance at the water line and an easing of the forward shoulder; the displacement there removed being placed in the bulb where it creates less resistance. It is not difficult to so shape the bulb as to obviate pounding. The structural members of the bow are more accessible for repair in the event of a grounding damage. The hull in way of the anchor handling should be canted forward as in naval practice or breasted out to provide proper clearance for the anchors as they pass the bulb. Tankship owners having experience with both types of bows have reported that the bulbous bow ship is more sea-kindly, is retarded less in heavy weather and manifests less of a tendency to pitch and take head or quartering seas over the bow.

In the construction of ships in the U. S. A. the trend has been to employ electric welding to the greatest extent possible because of the factors of weight saving, less time required for construction, and reduced cost. Abroad the tendency has been to adhere to riveted construction to a much greater degree.

In the U. S. A., the welded ship was born in the late thirties; thus it is still somewhat of an infant as regards development time in the history of shipbuilding, and it still has some growing pains. We have gained experience during the years with riveted construction by experiment and by observation of ships in service and it is only logical to expect that we will learn in a similar manner about welded vessels.

The timetable for producing ships during the war was made possible by welding. The volume of ship construction during this period was unprecedented, and involved the employment of a preponderence of inexperienced labor, yet the percentage of marine casualties directly attributable to welded construction is small compared with the number of ships built. Many welded vessels withstood the ordeal of enemy action during World War II, making port with gaping holes and vital portions of their structure torn away. The damages were localized to the area of the explosion and were expeditiously repaired by welding, to return the ship to active duty. Those vessels are conclusive evidence of the worth of welded construction. Under similar conditions, riveted ships would have opened seams for quite a distance from the damage, resulting in the probable loss of the ship. In cases of grounding or collision, the damages sustained by welded ships are likewise confined to the local area of the accident. The author believes in the future of the all-welded ship. Important factors that must be considered in any successful welded vessel are: (a) The elimination of hard spots and stress raisers from the design; (b) The maintenance of a proper welding sequence during construction; (c) The thorough inspection of all important welds by experienced and conscientious inspectors. Structural discontinuities in longitudinal members should be faired in to provide a smooth flow of stress. The connections of brackets to more flexible members should be carefully designed to prevent local working at the toe. On the construction side, groove preparation, correction of excessive root opening, back chipping and methods of starting and finishing welds should be closely checked. Weld quality should be checked by taking trepanning plugs as required, or by gamma ray inspection.

The present tendency to introduce several riveted longitudinal joints into the welded structure at shell and deck, stems from the idea that a riveted joint has enough slip to take sudden load concentrations created by heavy rolling and pitching of the vessel; also that in the event of the development of an incipient crack in the monolithic structure its continuance is stopped at the riveted joint. The straps may prove effective, and apparently it is on the safe side to employ them. Experimental research and experience must point the way for future design development, particularly as regards the evaluation of the effects of multi-axial stress and constraint, plastic flow, notch sensitive steels, low temperatures etc.

The sagging condition for the loaded tanker is productive of the highest bending moment and may be approximately evaluated by the formula:

Bending Moment (Ft. Tons)=Displacement x Length B. P./K, where K varies between the limits of 36 to 40.

The deck structure is subjected to severe compressive stresses in this condition and the strakes of plating at the centerline, over the longitudinal bulkheads, and the stringers should be made continuous and somewhat heavier in order to safely carry the loads imposed.

To determine stress distributions and efficiency of the

(Please turn to page 108)

On the Ways

New Construction — Reconditioning — Repairs

Bethlehem Converts LSM For East African Coastal Trade

The 214-foot, twin-screw motorship *Angoche,* the first LSM converted to a cargo carrier in accordance with Lloyd's specifications, sailed February 28 across the Atlanric for service under the Portuguese flag in the East African Coastal trade. She was converted by Bethlehem Sreel Company's Staten Island Yard, and will be delivered to Companhia Nacional De Navegacao, of Lisbon, Portugal. The craft was converted according to design plans of Angelo Conti, Inc., naval architects.

The stern of the former LSF 61 retains the rectangular characteristic of landing ships but there is little else to tie her in with her original classification.

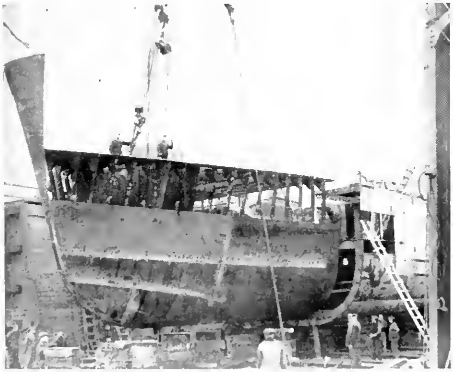
Her squared-off nose and landing ramp have been replaced by a "ship-shape" bow of conventional design. A creamy white superstructure, with comfortable quarters for eight pasengers, looms midships from her boom-studded continuous deck. Crowning her "new look," is a single streamlined black stack. To the landlubber, she looks more like a yacht than a freighter.

Listed at 1,300-deadweight tons, the *Angoche* is the first LSM to be converted to specifications making possible her classification under Lloyd's Register of Shipping. She passed her classification tests in a six hour run off Ambrose, during which she hit a speed in excess of 12 knots. She has a molded beam of 34 ft., depth of 18 ft. 5 in., draft of 12 ft. 4 in., and is twin-screw propelled. Her two diesel engines develop 2400 S.H.P. at 720 RPM.

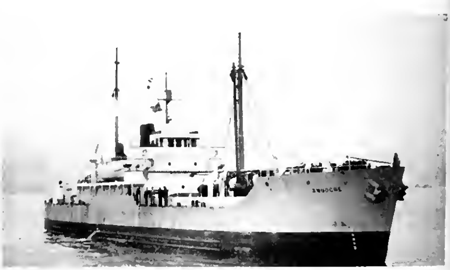
The new bow was prefabricated within the yard and then fitted onto the old hull while the *Angoche* was in drydock. This section weighed 30 tons and was 35 feet in length. A new deck, running the entire length of the craft, was built, and three cargo holds were provided, with new double tanks installed in the No. 1 hold.

A spacious midship three-high deck structure was built with pilot house, staterooms for 8 passengers and eleven officers, dining room, lounge, galley, and refrigeration storage for passengers and crew. The vessel also was ventilated for tropical service. Six booms stepped on two masts were installed for handling cargo loading and discharging. Her navigation equipment includes a gyrocompass, liquid compass, radio, and ship-to-shore telephone.

On delivery to her owners she is expected to join a fleet of five "feeder ships" serving coastal ports of the Portuguese colony of Mozambique.



Below is a picture of the completed Angoche after the new forward section shown at the lett had been added. The latter picture is from the February Pacific Marine Review. The Angoche is powered with a Fairbanks Morse Diesel engine.



The Magnolia

Top: The U. S. Coast Guard Cutter "Magnolia" is shown here in the first stages of her conversion from a Mine Layer to a Buoy Tender at Bethlehem Steel Company's Alameda Repair Yard. Bottom: After completion

The U. S. Coast Guard Cutter *Magnolia*, which was recently converted from a Navy Mine Layer (ACM) to a Buoy Tender at Bethlehem Steel Company's Alameda Repair Yard, is typical of the work this yard has done for the U. S. Coast Guard in this area.

The *Magnolia* was originally built for the U. S. Army as the *Colonel John Storey*. In 1944 she was renamed the *Barricade* when she was taken over by the Navy for duty in China seas. When she was recently turned over to the Coast Guard, considerable work had to be done on her in converting her from a mine layer to a buoy tender. All work in connection with this conversion job was done at Bethlehem's Alameda Repair Yard.

The *Magnolia* has an overall length of 190′, a beam of 37′, and weighs 900 gross tons. She is equipped with two 600 hp engines.

The *Magnolia* was drydocked at Bethlehem's Alameda Yard and her hull and weather decks completely sandblasted and painted. All machinery in her engine room, such as main engines, condensors, generators, pumps, air compressors, etc., were completely disassembled, cleaned, inspected and reassembled with new parts added where necessary.

All berths, lockers, inclined ladders on the first platform between frames 59 and 78 were removed and this space converted into a cargo hold. The space forward of bulkhead 78 to the bulkhead at frame 87 was converted into a fresh water tank and new piping was installed and connected to the fresh water manifold in the engine room.

The *Magnolia's* foremast was modified by installing a new 19′ extension. A new 20 ton boom, 47′-6″ long was fabricated and installed, and rigged with new 16″ triple blocks and 3/4″ Bethlehem improved plow steel wire rope on the hoisting engine drums.

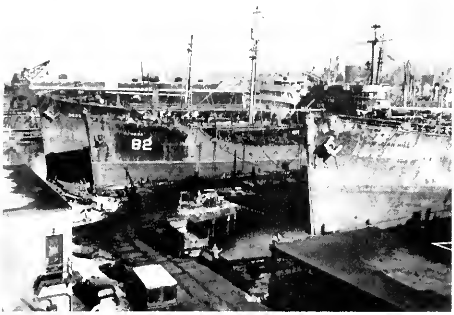
The present radio generator room on the boat deck was removed and incorporated in the auxiliary generator room, also on the boat deck. The space originally occupied by the radio generator room was converted into a wardroom pantry.

Extensive alterations to power, lighting and ventilation were made to suit the changes made.

The SL radar was replaced with radar of the SU-1 type and extensive changes were made in the radio room, incorporating all of the latest radio equipment supplied by the U. S. Coast Guard.

The *Magnolia*, now stationed in the Bay area, tends buoys on the San Francisco bar and for a short distance up the Sacramento River.

TODD READYING 52 TANKERS TO COMBAT OIL SHORTAGE



TANKER LINE-UP

A typical tanker scene at any one of Todd's shipyards. This is the Hoboken Division, which is readying 11 out of a total of 52 tankers at all Todd yards, to help combat the oil shortage.

Todd shipyards on both coasts and in Gulf ports are humming with activity in the reconversion and reconditioning of 52 much-needed oil tankers, mostly T2's, as a result of the current government-sponsored drive to relieve the national fuel shortage. The Todd yards began getting an unusual volume of tanker work as far back as October, and they have already readied many such vessels now in service. The number presently being reconverted have reached an unprecedented peak for this type of ship, and all were expected to be ready for service by the end of February, in plenty of time to step up the delivery of oil for winter use.

The two Port of New York yards alone were handling 20 tankers—11 at Hoboken and 9 at Brooklyn. The tanker assignments at the other Todd yards are: Seattle 8, Los Angeles 7, Galveston 10, New Orleans 4, and Charleston 3. The group now being rushed to completion represent over a half a million tons with an oil-carrying capacity of over 7 million barrels.

The tankers are nearly all being reconverted from wartime status, having been released from various reserve ship anchorages. Most of them are being "strapped" with 18-inch crack arrestors in accordance with owners' requirements and the recommendations of the American Bureau of Shipping. Four of them are also being stress-relieved as an added precaution against developing cracks.

When completed, the vessels will be turned over to a wide variety of owners and operators, foreign as well as American. Six of them are the Navy "Mission" type, similar to the "Mission San Luis Obispo," which last month delivered a huge oil loan to New York. These ships will be operated by private companies under charter. A number of others are being chartered from the U. S. Maritime Commission. Four of the tankers are for the French Mission, which recently purchased eleven, and there is one each for four other foreign-flag operators.

ONE NEW TANKER EQUAL TO FOUR

It would take at least four prewar type tankers to match the performance of one new American oil carrier.

Increased speed, greater efficiency and larger size make the 21 oil tankers now on order or under construction, equal to 84 prewar tankers, according to the American Merchant Marine Institute.

One out of every six large ships building in the world today is an oil tanker. In the United States, however, virtually all new construction is made up of ships for the oil transportation industry, the AMMI pointed out.

Of the 21 new tankers presently on order, 16 are 27,500 ton vessels which will boast speeds of 16½ knots, four are 18,000 ton ships with speeds of 14½ knots, and the 18th is a 30,000 ton giant, with a 16½ knot speed. The prewar American tanker averaged 11,600 tons as compared to the average of 25,500 for these 21 new vessels. Average speed of the 1939 oil tanker was 10 knots. The ships building today average 16 knots in speed.

The American tanker fleet is the world's largest, being twice the size of its nearest rival, the British. Ranking behind the United States in size are the fleets of Breat Britain, Norway, Panama, Holland, Sweden, France, Italy, Argentina and Russia, to name the top ten.

Broken down by per cent, the American tonnage represents 45.62% of the world's fleet. Britain's tanker tonnage includes 21.59% of world tankers, while Norway, with 10.11%, is the only other nation above 10 per cent.

Running Lights

Andrew

Anthony

Moran

•

Vice President
Interocean
Steamship
Corporation

(See page 88)

In this picture taken at the February meeting of the Women's Organization for the American Merchant Marine, San Francisco, the speaker, Robert E. Mayer, is shown chatting with past president Mrs. Harry W. Parsons. Clockwise from Mayer around the table are president Mrs. John Johnston, Matson's Captain M. Stone, Mrs. C. W. Lowith, Mrs. Walter Walsh, Mrs. J. O. Schutzer, Mrs. Marie Beckwith, Mrs. Leslie White, Mrs. Maxine Law, Mrs. J. J. Lewis, and Miss Alma Canavan of Pacific Marine Review.

MAYER SPEAKS AT WOMEN'S MEETING

In an ably presented address before the members of the Women's Organization for the American Merchant Marine, Robert E. Mayer of the Pacific American Steamship Association brought the record up to date on shipping conditions and problems. That his message was effective in relation to the Marshall Plan is indicated by the action of the Senate after receiving protesting letters from our leading ladies on the "donate ships to Europe" phase of the Plan.

The meeting was presided over by President Mrs. John F. Johnston and was held in the Army-Navy Club of San Francisco.

Robert Mayer

Moran Elected to Board of Marine Exchange

Andrew A. Moran, new vice president of the Interocean Steamship Corporation, Ltd., has been elected to membership in the board of directors of the Marine Exchange.

Mr. Moran, long prominent in Bay Area maritime activities, was one of three original founders of the present operational setup of the Exchange, along with John C. Rohls, retired marine department manager of the Standard Oil Company and Frank O'Connor, presently a director of the American President Line. He has recently been manager of the Port of Redwood City, on San Francisco Bay.

Moran, chairman of the Bay Area Council's Maritime Committee, recently presented to the coastwise transportation meeting held in San Francisco, a plan to develop the overland cargo movement of the Bay Area and the Pacific Coast. Basis of the plan is the formation of a traffic and transportation bureau modeled along the lines of the New York Port Authority and a somewhat similar and very successful bureau in New Orleans.

Moran is best remembered for the part he played in establishing the round-the-world service of the former Dollar Line, the first of its kind in transportation history.

ADVERTISING — THINK IT OVER

An inch won't make you very tall,
You've got to keep on growing;
One little ad won't do it all,
You've got to keep them going.
One step won't take you far,
You've got to keep on walking;
One word won't tell folks who you are,
You've got to keep on talking
A constant drop of water
Wears away the hardest stone;
For the constant-gnawing Towser
Masticates the toughest bone;
The constant-cooing lover
Carries off the blushing maid;
And the constant advertiser
Is the one who gets the trade.

ı Francisco
roeller Members
rı Smart

lı the radio program, 'Quiz of vıCities", broadcast over the Mu-ıDon Lee Network Sunday eve-ıg February 22, the San Fran-cıclub beat the Los Angeles club ı small margin. The San Fran-cı team is shown in the photo uing up the loot.

Sıne of the questions were posers ıe industry's best brains. Capt. d Harms, operating manager, p & Talbot Lines, knew what ıks moth holes. Gene Hoffman, ırger of public relations and ad-ıting, American President Lines, e where to find Tara's Halls. ıg Gallagher, vice president and eıting manager, Matson Lines e who got the axe. Lewis Lap-ıpresident, American Hawaiian ıaship Company, and president e Propeller Club, knew his cd Neighbors".

The fine looking group of men above consists of Lewis Lapham, Eugene Hoffman, Hugh Gallagher, Bill Gwinn, and Edward H Harms. Eddie Harms was captain of the San Francisco club's team and was as fast as Mercury with the answers.

I can tell the time," says Miller, without help from the P G & E And I can determine the weather by looking out the window "

PROPELLER CLUB PRESENTATION TO LAUGHTON
At the San Francisco Propeller Club meeting in February, retiring president W. Miller Laugton.

Letter to the Editor

Naval Architect Submits a Good Idea

Pacific Marine Review
500 Sansome Street
San Francisco 11, Calif.
Attention: The Editor

Gentlemen:

In the past year, it has been my duty to survey a large number of craft which were damaged as a result of striking floating debris. In spite of the regulations dealing with the disposal of waste, a large amount of lumber, garbage, and other material finds its way into the waters of San Francisco Bay and its tributaries. If one requires visual proof of this situation, a quick glance at the Oakland Estuary will be highly convincing.

Operators of vessels are sufficiently impressed with the value of their charges to be very circumspect when navigating in a concentration of rubbish. In spite of all the care that is exercised, it is almost impossible to see many pieces of wood and rope which float very close to the surface. As a result, damage to bottoms and propelling gear are reported every day of the week. The repairs that are necessary range from neglibible costs to expenditures of many thousands of dollars. This situation is becoming increasingly worse and something should be done to rectify it.

The port of New York has under construction a drift collector for the purpose of picking up and disposing of floating matter which is a danger to navigation. It is highly desirable that the port of San Francisco should also have such a vessel. I should like to suggest for your consideration, because of the preeminence of your position on the West Coast, that you urge the proper authorities to construct and operate a drift collector in San Francisco Bay. The cost of a vessel of this type will be about $350,000 but I am certain that the expenditure would soon pay for itself in the saving of damage to vessels which use our excellent port.

Very truly yours,

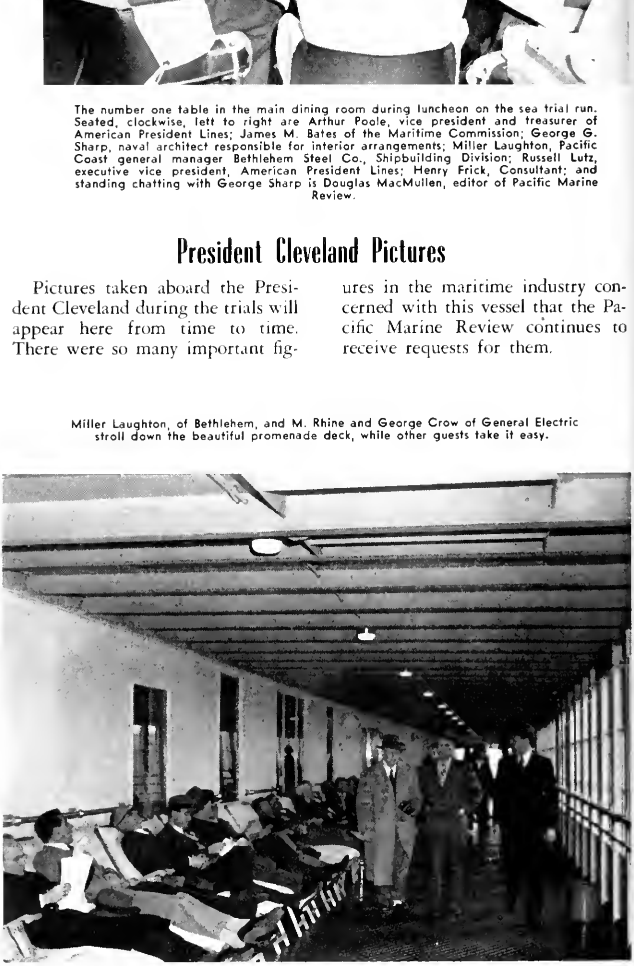
MORRIS GURALNICK

The number one table in the main dining room during luncheon on the sea trial run. Seated, clockwise, lett to right are Arthur Poole, vice president and treasurer of American President Lines; James M. Bates of the Maritime Commission; George G. Sharp, naval architect responsible for interior arrangements; Miller Laughton, Pacific Coast general manager Bethlehem Steel Co., Shipbuilding Division; Russell Lutz, executive vice president, American President Lines; Henry Frick, Consultant; and standing chatting with George Sharp is Douglas MacMullen, editor of Pacific Marine Review.

President Cleveland Pictures

Pictures taken aboard the President Cleveland during the trials will appear here from time to time. There were so many important figures in the maritime industry concerned with this vessel that the Pacific Marine Review continues to receive requests for them.

Miller Laughton, of Bethlehem, and M. Rhine and George Crow of General Electric stroll down the beautiful promenade deck, while other guests take it easy.



VERNON S. SHOWELL Completes Forty Years With Bird-Archer

Left to right: B. R. White and Vernon S. Showell of Bird Archer Co.

Vernon S. Showell, general manager of the Bird-Archer Company of California, recently completed forty years of service with the company. Probably known to as many seagoing and shore-side marine engineers as anyone on the Pacific Coast, he has been general manager of the Bird-Archer Company since 1918. He has played an important part with the company in pioneering boiler water treatment and the development of test equipment in the merchant marine which has now become a must in the safe operation of the modern marine high pressure boiler.

Showell remembers "hoofing" the waterfront when the horse and buggy was a luxury. When a steamer arrived in port in those days it was a question of how many boiler makers and how many scalers were required. Nowadays it is a question whether any are required, and why.

The Salinometer was then "the king." Feed water was tested by taste and all boilers were loaded with zinc plates. "Mr. Alkalinity" was not yet born. Water tube boilers, then called "pipe boilers," were in their infancy. Coastwise shipping was at its height with a hundred steam schooners and probably more than thirty passenger ships, including ships to Panama.

Bird-Archer Company of California have qualified representatives at all Pacific Coast ports, and in conjunction with Timmons & Charles of Jersey City and the Bird-Archer Company, Limited of Canada, they maintain service in all American and Canadian ports.

We Really Haven't Room For This

Grandpa: "I miss the old cuspidor since it's gone."

Grandma: "You missed it before—that's why it's gone."

Who's Who in Everett Pacific Group

This picture is repeated from our February issue in order to correct a bad mistake in its caption. Correct names are given herewith:
Left, front to back: R. LeBlanc, General Manager, Everett Pacific Shipbuilding and Dry Dock Company; Mrs. J. P. O'Rear; H. I. Chatterton, Administrative Assistant, Everett Pacific; Mrs. J. A. Byington; R. C. Owen, Port Engineer, Luckenbach S.S. Co.; Mrs. N. W. Reklev; Mrs. R. C. Owen; Q. A. Herwig, Marine Service, Inc.; Mrs. J. M. Finlaw.

Right, front to back: N. W. Reklev, Estimator, Everett Pacific; Mrs. G. W. Simpson; J. P. O'Rear, Estimator, Everett Pacific; Mrs. R. LeBlanc; H. P. McLaughlin, Asst. Gen'l Superintendent, Everett Pacific; Mrs. H. I. Chatterton; Mrs. H. P. McLaughlin; Mrs. Q. A. Herwig; J. M. Finlaw, 1st Lt. ATC., Contract Accountable Property Officer, S.P.O.E.

Leighton Stone

John Dietzman

Ronald Oldershaw

Robert Long

THE SWETT-STONE CORPORATION

To facilitate operations and to improve service, George E. Swett & Company, Engineers, San Francisco, has assigned a number of the products that they represent to a new organization which will be called the Swett-Stone Corporation, it is announced by George E. Swett.

While the new corporation will be partially controlled by Swett, it will operate as a distinct organization under the management of Leighton Stone, who has been a service engineer with the George E. Swett & Co., Engineers, for 20 years.

The offices will be located on the third floor, 256 Mission Street, San Francisco. The Swett-Stone Corporation will represent the following well-known products: Manning, Maxwell & Moore Safety Valves and Gauges; Fisher Governors and Controls; Ilg Blowers and Fans; Cunningham Whistles; Copaltite Joint Compound; Paxton-Mitchell Rod Packing and Cylinder Liners; and Cuno Filters.

The George E. Swett & Co., Engineers, will continue to represent Warren Pumps; Carrier-Brunswick Refrigeration, Air Conditioning; Markey-Cunningham Steering Gears; Diamond Soot Blowers; Smoke Indicators; and Davis Heat Exchangers.

By thus separating the products into specialties and major equipment, it is possible for the personnel to offer more exacting and specializing engineering, sales and service.

Leighton Stone who will direct the work of the Swett-Stone Corporation has mostly specialized in the products that have been assigned to the new corporation. He attended Columbia for two years and then received his degree from the University of California in 1928 at which time he joined the Swett organization.

Ronald Oldershaw and John Dietzman will also be associated with Stone as sales engineers. Robert Long will be purchasing agent for the Swett-Stone Corporation.

"We have planned this separation of products for some time as we have found that some of our men are more familiar and know more about all the problems of a few of the products and by permitting them to give all of their time and thought to them, we can offer faster and more thorough service all the way from the planning operations to the complete installations in which these products play their part," reports George E. Swett.

The George E. Swett & Co., Engineers, will continue to be managed by George E. Swett.

Geo. Swett Appoints—

Henry J. Wickert has been appointed manager of equipment sales of the George E. Swett & Co., Engineers, San Francisco, it is announced by George E. Swett, president and general manager. He will have charge of the sales of the following products: Carrier Refrigeration and Air Conditioning Equipment, Warren Steam and Centrifugal Pumps, Davis Heat Exchangers and Markee-Cunningham Steering Gears and Deck Equipment.

Wickert will absorb the duties of Henry Craig who has resigned. John Marsh and Henry Buffalo will continue as chief engineer and superintendent of construction respectively.

Frank Sloman has been promoted to office salesman of the refrigeration department under the direction of Wickert. Henry J. Wickert, an ex-naval officer who was chief engineer of an escort-type destroyer, is a graduate of Cornell University and has been with the Swett organization for the last two years.

Harbor Supply Company

In announcing the appointments of Homer Potter and Captain Konrad Nystol to the force of the Harbor Supply Company, 821 Folsom Street, San Francisco, A. F. (Al) Devoto, Vice President and General Manager, adds that his ship chandlery firm have sufficient stocks to supply huge quantities of deck, engine room and steward supplies.

Mr. Ed Whittemore, Sales Manager and General Partner for the Atlas Paint & Varnish Co. of Los Angeles, recently assigned Homer to his new post as manager of the San Francisco office.

Captain Konrad Nystol, in charge of Harbor's Foreign Ship Department, was educated in Sweden and speaks four languages fluently. In World War II he was decorated with the Royal Cross by the King of Sweden for outstanding services as Captain in the Royal Swedish Navy.

Also on Harbor's staff and very well known to the marine fraternity are Hobbs Merle, Jim Burke, John Eagen and Ben Limberg.

Manufacturers represented by Harbor Supply include: Great Western Cordage Company, manila rope; Jones & Laughlin Steel Corporation, wire rope; Atlas Paint & Varnish Company, marine paints; Boston & Lockport Co., tackle blocks; Sumco Products Co., Inc., cleansers and engine room chemicals; Walworth Company, valves; Columbia Steel Company, wire products, steel and sheets; Griffin Manufacturing Company, hinges and butts; Pheoll Manufacturing Company, screw products; Bright Star Battery Company, flashlights and batteries; Band-It Company, clamps and tools; Thomas Laughlin Company, shackles, hooks, etc.; Diamond Calk and Horseshoe Company, wrenches and pliers; Halstead Products, oils; cutting and penetrating; Palmer Thermometers; Bell & Gossett, heat exchangers and centrifugal pumps; Fulton Sylphon Company, temperature controls; Pioneer Rubber Company, hose and packing; Wilcox-Crittenden Company, blocks, shackles; and the Young Iron Works, Seattle, Washington.

In addition to the Folsom Street plant, Harbor also maintains warehouses on Clara Street and at 6th and Hubbell Streets in San Francisco.

Harbor Supply Company Warehouse

Top: Harbor Supply Sales Staff. Left to right: Hobbs Merle, Jim Burke, Captain Konrad Nystol, John Eagen, and Ben Limberg

Bottom: Harbor Supply Office Staff.

Right: Homer Potter, Atlas Paint Company (standing), and A. F. (Al) De Voto, Vice-President and General Manager of the Harbor Supply Co.

R. L. Minckler New President of General Petroleum Corporation

R. L. Minckler has been elected president of the General Petroleum Corporation, succeeding on January 1, S. J. Dickey, who is retiring. R. A. Sperry, senior vice president and a director of the concern also retired on that date.

Minckler was born in Minneapolis and first worked for the Great Northern Railway. He served in the Army during World War I and subsequently attended the University of Washington. Before joining General Petroleum in 1924, he worked for a transpacific steamship line and the Southern California Edison Company.

He was elected a General Petroleum vice president in 1945 after having served as Director of Petroleum Supply of the Petroleum Administration for War. In June of 1947 he was one of three western men appointed to the government's 15-man Military Petroleum Advisory Committee.

Dickey has been president of General Petroleum since 1941. He first joined the company in 1919 and became chief engineer in 1920. By 1927 he was a director, and by 1930, vice president in charge of manufacture.

Sperry is one of the pioneers of General Petroleum and the oil industry, having started work in the Kern River fields in 1901. He joined General Petroleum in 1912, becoming a director in 1925 and a vice president in 1926.

Open house at Refrigeration Components, Inc., one of many parties held during the holiday season in San Francisco. Left to right: Fred Murdock, Pacific Coast Instrument Co.; Ralph DePuy, Isthmian S. S. Co.; George A. Horton, Jr., and Harold Wrigley, International Paint Co.; George A. Horton, Sr.; Herb Southworth, Herbert Southworth Co.; Jack Frost, Refrigeration Components; Mary Ann Esser, Ken Zappettini, Refrigeration Components; Sis Esser; Lea Zappettini; Esther Frost; Fred Esser, owner and general manager of Refrigeration Components, Inc.

Frank Cameron Joins Agency

Frank Cameron, who recently completed a special pr motional assignment for American President Lines connection with the new luxury liner President Clevelan has joined the Frank DiMarco Agency as Account E exutive. While with APL he served as assistant to Euge F. Hoffman, Public Relations and Advertising Direct

Cameron formerly handled publicity for Grace Line New York, moving to San Francisco in 1946. He w associated with the Public Relations Department of Ma son Lines prior to accepting the President Clevela assignment. In his new capacity he will specialize steamship and travel promotion.

R L. Minkler, far left, and S. J. Dickey

STANDARD OIL (NEW JERSEY) INCREASES
ORDERS FOR SUPER TANKERS TO SIX

Two more super tankers with a capacity of 228,000 barrels each were ordered by Standard Oil Company (New Jersey), increasing to six the number of such tankers contracted for within the last four weeks.

Each of the six vessels will have a capacity about 70 per cent greater than the T-2 type tankers constructed during the war. The total capacity of all the ships will aggregrate 57,456,000 gallons and their construction, M. G. Gamble, general manager of the Company's Marine Operations, said, will cost about $31,500,000.

The two additional tankers will be built by the Newport News Shipbuilding and Dry Dock Company, Newport News, Va., with delivery scheduled the latter half of 1949. Two of the vessels ordered earlier also are being constructed by the Newport News company and the other two by the Sun Ship Building & Dry Dock Company, Chester, Pa. One is scheduled for delivery by the end of this year and the other three early in 1949.

* * * * *

STEAMER H. F. ALEXANDER

The famous coastal liner H. F. Alexander has been sold to the Boston Metals Corp. for scrapping.

* * * * *

S. F. PORT CONTROLS PACIFIC SHIPPING FOR ARMY

Under the Transportation Corps "Outport" system, the San Francisco Port of Embarkation is charged with responsibility for supply of Japan, Korea, the Philippines, Okinawa, China, Hawaii and the Marianas. All cargo movements to those areas, regardless of port of origin, are directed and controlled by the Port here.

The tonnage for 1947 represents shipments made to the overseas bases served by the Port from almost a score of American ports, including those in the San Francisco Bay Area and Seattle, Portland, Los Angeles, New York, Baltimore, New Orleans, Mobile and other Atlantic, Pacific and Gulf points.

* * * * *

CALIFORNIA SHIP REPAIR

California Ship Repair Corporation, a newly organized Oakland ship repair yard, is getting into full operation at the foot of Washington Street on property leased from the Port of Oakland, according to J. F. Smith, president of the company.

Located in an area that was formerly the Graham Shipyard, the new firm has at the present time $120,000 worth of contracts for landing craft repair. Smith reports that work is in progress on a contract with the Ed Newman ship brokerage company in San Francisco to wreck nine LSM's for salvage. Plans have also been made to sell vessels and all types of parts.

Another important job for the new yard is the conversion of two LST's soon to enter the coastwise service under the flag of a new Oakland shipping company, Larrabee, Sutherland & Tarr (The LST Line).

Smith has been active in the bay area and Pacific Coast shipping business for thirty years. He was the founder and president of the Maritime Engineering

and Ship Repair Company in San Francisco and only recently sold his interest in that company.

General manager of the California Ship Repair Corporation is H. T. Hill, onetime port manager for Interocean.

* * * * *

NEW FIRM AT SEATTLE

A new marine supply house in Seattle, known as the Seattle Marine and Fishing Supply Company, was recently formed by four Seattle men, Mel Anderson, M. A. McQuarrie, Eugene D. Shaw and Harold Olson. The company was formed out of the purchase of the Tacoma Marine Supply Company, Tacoma.

* * * * *

S. F. HARBOR BUSY

38 vessels entered San Francisco Harbor Feb. 27, a peace time shipping record for a 30-hour span. 15 of the vessels berthed in San Francisco, 15 berthed in Oakland harbor, four went to Richmond, two to Oleum, and two to Stockton. Included in the group were six tankers, and three Naval craft.

Only two of the Naval vessels were actually on Naval service, the other being a cargo vessel, while the remainder were all regular cargo vessels on scheduled runs.

* * * * *

RENAMING OF NAVAL INSTALLATIONS

According to "Long Beach Press-Telegram" of January 13, the United States Navy has renamed the U. S. Naval Shipyards to Long Beach Naval Shipyards, Long Beach, and the U. S. Naval Station, Terminal Island to Long Beach Naval Station, Long Beach.

* * * * *

SPARROWS POINT GETS TANKER ORDER

J. M. Willis, general manager, Baltimore District, Bethlehem Steel Company, Shipbuilding Division, confirmed that the Bethlehem-Sparrows Point Shipyard, Inc., has closed contracts for the building of four 18,000 ton tankers.

Explaining why the tanker orders had been placed in the United States when shipbuilding costs abroad generally are lower, Mr. Willis said:

"The prospect for earlier delivery of these vessels by the Sparrows Point shipyard offsets somewhat the higher costs of construction in this country."

* * * * *

U. S. CHAMBER URGES SALE OF FEDERAL BARGE LINES

Prompt enactment of legislation for disposal of the Federal Barge Lines of the Inland Waterways Corporation was urged by the Chamber of Commerce of the United States in a communication sent to the House Committee on Interstate and Foreign Commerce.

The Chamber said the barge lines have long since completed the demonstration for which they were originally created in 1924, that they are a source of unfair competition to private business and a burden on the taxpayers because of failing to meet expenses, and that private operators are willing and able to carry on the service.

* * * * *

KAISER'S PIPE MILL IN FULL PRODUCTION

Full production has been reached at Kaiser Steel's pipe mill in Fontana.

The mill, first of its kind west of the Mississippi, has been geared to produce up to 125,000 tons of pipe annually in sizes ranging from one-half to four inches in diameter.

* * * * *

BUYS HENDY WORKS

The National Products Corp., Pittsburgh, Penn., recently purchased the Joshua Hendy Iron Works, Torrance, Calif.

The company said it plans to make flexible electrical conduit, tubing and fittings, probably beginning in September.

$500,000 PLANT BEING BUILT IN S. F.

Construction has begun on a $500,000 plant for the Texas Company to serve as the oil concern's main central California distribution headquarters.

The project, which will include 12 large storage tanks and a one-story office building, will be completed in about three months.

The building will house Texas Company's sales and local administrative forces and will cover an area 75 feet by 300 feet.

* * * * *

BETHLEHEM AT PEAK EMPLOYMENT

An indication of the leading role Bethlehem Steel Company's San Francisco yard is playing in the industrial life of San Francisco and the Bay Area is seen in employment figures released by T. C. Ingersoll, Manager. He revealed that employment at the San Francisco Yard now stands at over 4,000, the largest number employed by the yard during the postwar period and the largest employed by any privately operated ship repair yard in the Bay Area.

* * * * *

NEW STEAMSHIP BUILDING

152 Sansome Street became the official headquarters as of March 1 of Coastwise Line and its allied shipping interests, Coastwise Pacific Line and Coastwise Bulk Carriers. The telephone remains unchanged, YUkon 6-4114. Recently remodeled into a modern steamship office building, 152 Sansome was leased on a long-term basis to house the three operations.

* * * * *

S. F. FOREIGN TRADE ZONE

Official signing of the charter granting San Francisco its Foreign Trade Zone by Secretary of Commerce W. Averell Harriman took place in Washington, D.,C., March 10.

* * * * *

U. S. STEEL BUYS S. F. WAREHOUSE

United States Steel Supply Company, which maintains headquarters in Chicago, has purchased the block-long warehouse and facilities at 1940 Harrison Street, San Francisco, from Columbia Steel Company, L. B. Worthington, President of the purchasing company, announced. Both U. S. Steel Supply and Columbia Steel are subsidiaries of United States Steel Corporation.

* * * * *

RAILROADS ARE BUILDING

Class I railroads had 1,513 locomotives and 107,364 freight cars on order on February 1, this year, the most since September 1, 1923. The number of locomotives for which orders had been placed on February 1, 1948, included 96 steam, three electric and 1,414 Diesel locomotives compared with 53 steam, six electric and 580 Diesel one year ago.

Class I railroads and railroad-owned private-controlled refrigerator car companies put 8,240 new freight cars in service in January, 1948, compared with 2,795 in the same month in 1947.

* * * * *

LUCKENBACH BUYS SHIPS FOR BIG CONVERSION JOB

Luckenbach Steamship Co. has purchased for its intercoastal service five C-2's and 11 C-3's. They will be immediately converted to the requirements and seven of the C-3 type will be converted in Pacific Coast yards. Naval Architect M. J. Ryan is supervising the work.

* * * * *

UNITED FRUIT RESUMES SAN FRANCISCO SERVICE

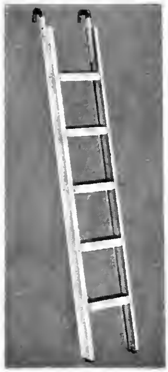
With the arrival in San Francisco on Feb. 26 of United Fruits Comayagua with 38,000 stems of bananas, the company resumed its weekly service to S. F. and Seattle.

KEEP POSTED

New Equipment and Literature for Yard, Ship and Dock

Ladder

The Aluminum Ladder Co., now manufactures a new type berth ladder. The new ladder is constructed entirely of lightweight aluminum alloy securely riveted with sturdy aluminum rivets. It weighs only 9 lbs. complete with hooks and may be moved about quickly and easily by one person.



New Flexible Tubing Company Starts Operations

Flexible Tubing Corporation, organized late in 1947, has just announced its entry into the flexible tubing field. Laboratory, design engineering and manufacturing facilities will all be centered in Branford, Connecticut.

President and Treasurer of Flexible Tubing Corporation is Frederick K. Daggett, former Sales & Engineering Manager of the Spiratube Division of the Warner Brothers Company, Bridgeport, Conn. Secretary is Joseph B. Morse; New Haven Attorney and member of the firm of Pond, Morgan & Morse. Assistant Treasurer, Alexander K. Murphy, formerly of the New Haven Clock Company.

Maxim Silencer Company Manufactures CQR Plow Anchor

The Maxim Silencer Company of 85 Homestead Avenue, Hartford, Connecticut is now manufacturing the CQR Plow Anchor, under license from Henry T. Meneely & Company, American licensees of the Security Patent Anchor Company, Ltd. of Scotland.

The CQR Plow Anchor offers many advantages to the boat owner. It is claimed to be absolutely nonfouling as there is nothing on which the anchor chain can foul. Tests made by the manufacturer show that it has far greater holding power and that its plow design minimizes the possibility of dragging and insures quick setting and resetting in the average bottom. It is also claimed that the Plow Anchor will not foul up with mud, but cleans itself due to the basic plow design. Tests have shown that it breaks out easier than anchors of other design when the cable is up and down. The CQR Plow Anchor is always ready to put over the side, always made up and lighter to handle. Widely used in British waters, the Plow Anchor is standard equipment in the British Navy and Air Force.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

.... issue. Page No.......

....

....

....

(Identify by name of manufacturer and catalog)

NAME..

BUSINESS..

ADDRESS..

....

New Ship Structure Materials

(Continued from page 49)

a few sailing ships and light-draft paddle steamers. Mild steel of fair quality, using the Bessemer and Siemen's processes, was produced by 1873 when is was used in the construction of French warships. The first edition of the Carnegie Pocket Companion appeared at that time, a milestone in American iron and steel production.

By 1875, as a result of marked improvements in the Siemen's process, mild steel of excellent quality was made commercially available. In that same year, two British warships were built of this material. For merchant vessels, however, steel was no threat to iron construction in those early days. Though Lloyd's sanctioned its use, even permitting a reduction in scantlings of 20%, steel's relatively high price and delays in delivery deferred its adoption until 1878. Eleven steel vessels were built and from that day forward, steel merchant vessels were built in rapidly increasing numbers, to the almost complete exclusion of iron as a hull material.

Steel, however, was not adopted in place of iron so that vessels built of it might be stronger. It was adopted so that smaller scantlings made possible by its greater strength and improved mechanical qualities might proportionately increase carrying power, armor and armament. This was accomplished by reduced structural weight and vastly improved commercial and naval efficiency. By the early 1890's, steel of consistently good quality was in common use for ship construction. The steamship was entering the heyday of its career and development. International competition in overseas commerce was leading to the production of increasingly large ships, particularly of great passenger vessels for the North Atlantic—North America traffic. The modern warship was divesting itself of out-dated and superfluous top hamper. Universal recognition of the importance of sea power in international relationships produced the race for armaments, ultimately leading to the era of the torpedo, the submarine and the dreadnaught.

Introduction of the steam turbine gave to ship propulsion an effectual, space-saving power plant aimed to counteract the massive requirements of the compound reciprocating engine for large-sized ships. Specialists became increasingly essential to the building of faster ships and their machinery. Recognition of the metallurgist in commercial production, preparation and treatment of metals and alloys, approached that of the naval architect in design and the shipbuilder in construction.

The cost of mild steel in the early days of its adoption for merchant ship hulls was roughly twice that of iron. To compensate for the use of steel, an increase in commercial efficiency became mandatory to overcome higher first costs. Thus, it developed upon the classification societies to decide how much scantlings might be reduced to equalize for the higher strength and more uniform qualities of steel. They concluded that a reduction of 20% in thicknesses was safely permissible, experience having indicated that the strength and stiffness of iron and steel structures were then fairly equal.

This reduction was made conditional on standardized and systematic testing of the steel supplied for vessels classed by Lloyd's. It is surprising today that tests at that time were considered particularly necessary for steel and not for iron. The answer lies in the fact that the quality of mild steel was then better than iron, but iron's defects were known while steel sometimes exhibited defects so unfamiliar that much doubt existed as to its suitability for ships' hulls. For example, iron plates might crack *during* a forming operation requiring only a small amount of familiar shop work. Steel, on the other hand, though more ductile, might crack spontaneously *following* the same amount of work.

Spot testing of steel was at first resorted to, but much inferior material escaped detection by this method. Moreover, tests were conducted at the shipyard where facilities were not always of the best. It was finally agreed, and rightly so, that testing of the steel be done by the manufacturer, *but* in the presence of the classification societies surveyors.

High tensile steel came into use following the invention of the torpedo and the mounting of this weapon in 1873 on torpedo boats, originally carried aboard large warships. The necessity for lightness in torpedo boats became apparent as they developed, both for high speed and for reduced weight to assist hoisting off and on the parent ships. This high strength alloy was also originally used for light, shallow-

(Please turn to page 105)

Garratt-Callahan Company of California

Judging from the smiles of this group, the "House of Magic" must be a pleasant place in which to live. Whatever the reason, the group spirit reflcted by this picture is pretty good evidence that the recent Garratt-Callahan general sales meeting was a success. Held at the Palace Hotel, San Francisco, from January 5 to 8 and attended by a good proportion of the firm's field staff, the meeting served to implement the expanded sales program inaugurated by the company last year.

Garratt-Callahan Company of California are manufacturers of "Magic" Boiler Preservative, "Flo-rite" Fuel Oil Conditioner, and other "House of Magic" chemical products for power equipment.

Those attending the meeting were, top row, Jack M. Crowe, Sacramento; George G. Bennett, Salt Lake City; Wade V. Goodin, East Bay; Paul T. Hodgson, Fresno; Thomas W. Wold, Seattle; Frederick B. Dennis, plant superintendent. Bottom row, Emer Huish, San Francisco; Charles I. Gould, Los Angeles; Mansfield W. Garratt, Jr., chemist; Frederick P. Teall, sales manager; Mansfield W. Garratt, Sr., president; Edward Bus, marine.

WESTINGHOUSE BOOK ON PASSENGER AND CARGO VESSEL EQUIPMENT

A 90-page booklet presenting all the factors affecting the selection of steam and electrical equipment for passenger and cargo vessels has been announced by Westinghouse Electric Corporation.

The booklet provides a complete and analytical discussion of the six modern types of ship propulsion with the relative advantages and future trends of each. Auxiliary power generation and distribution equipment for shipboard utilization of both a-c and d-c systems are similarly discussed.

Complete with photographs, sketches, tables and curves, the booklet provides useful data and information on auxiliary motor and controls, radar, maintenance, and marine accessories for all compartments aboard ship.

Frank Groves Opens at Wilmington

Frank Groves, president of the Frank Groves Company, announces the opening of offices and warehouse at 111 West C street, Wilmington, California. The company now has complete coast coverage with offices and warehouses in San Francisco, Portland, Seattle and Los Angeles.

A complete stock of refractories, gaskets, packings, gages and thermometers, in addition to their regular steam specialties, is carried at the new Southern California headquarters.

Frank Groves is spending much of his time at the Wilmington offices assisted by Ken Paxton and Art Kolstad.

Adjust-A-Leg Equalizing Slings

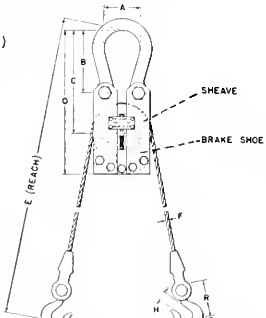
Now being offered by The Caldwell Company of Rockford, Ill., is an improved model of their Adjust-A-Leg Equalizing Sling; this replaces the model previously used. Available in capacities ranging from ¾-ton to 12-tons, with a Safety Factor of Five, these units are designed to lift odd-shaped and unbalanced loads level or at almost any predetermined angle; they are also valuable for moving simple loads, and are particularly suitable for working in confined spaces.

The Sling consists of an equalizing unit equipped with wire rope. The equalizing unit is made up of a sheave (with a V-shaped groove) carried by a spring-mounted axle, and a pair of brake shoes. The rope, which lays over the sheave in the V-shaped groove, has a hook attached to each end, forming two legs.

The V-groove feature in the sheave of the improved Adjust-A-Leg Equalizing Sling eliminates rope crowding. As a result, there is less rope wear, and freer movement of the sheave than in the former design.

For further information write: The Caldwell Company, Dept. 48, 1830 Camp Avenue, Rockford, Ill.

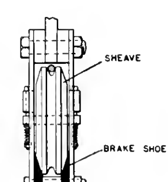
(A)



Illustrated: Type CSE-10

TWO TYPES OFFERED	
CSE- 5:	Hooks spliced in; not removable.
CSE-10:	Open sockets; hooks removable.

(B)



he Flight of the
.omul Kite

August Schlueter (center) greets Jim Hoeveler (left) and Bill Reilly at Central Airport, Camden, New Jersey, on their return from their recent trip.

Selby, Battersby & Company of hiladelphia have a flying depart- ent known as the Marine Mate- al Sales Department and managed 7 August Schlueter assisted by J. . Hoeveler, Jr., and W. F. Reilly. 7ell known in the marine field for 7er thirty-five years as manufac- ırers and applicators of all types of ɜck coverings, the company han- es Komul, the coal tar pitch emul- on formulated as a cold-applied ıti-corrosive coating. The product ıs been on the market for approxi- ately twelve years and is handled 7 the Marine Material Sales De- ırtment. "Komul Kite" is the name this department's five-place eachcraft in which they travel the ountry promoting their products, ıd Jim Hoeveler, the pilot, and ill Reilly, co-pilot and navigator, e known as the "Komul Kids."

Recently they traveled around the ountry in their "Komul Kite" to ıpervise the application of Komul all the U. S. Maritime Commis- on Reserve Fleet sites and to in- ɔect work done at the various U. S. aval Reserve Fleet sites. They also ontacted all Naval Shipyards as well private shipyards and steamship ompanies, and were on the trip ɔout two and a half months.

The only delay encountered on ıe entire trip was three days due to eather, and no delays from echanical trouble. The "Komul ite" has proven a very satisfactory ıd economical method of covering rge territories. During their flights ıe "Komul Kids" work with the mpany's distributors: Marine Con- actors Co., Boston; Ray B. Cralle, ampa; Marine Specialty Co., Mo- le; Marine Welding, Scaling & ıles Co., New Orleans; J. M. Cos- llo Marine Supply Co., Wilming- ɔn, California; Cordes Brothers, ın Francisco; Marine & Industrial ıpply Co., Portland; Tourtellotte Bradley, Seattle.

Sperry Describes Rudder Angle Indicator

A revised marine catalog section describing the Rudder Angle Indicator has just been issued by Sperry Gyroscope Company. Available from Sperry on request, the publication number is 18-5A.

The section defines the function and specifications of the Rudder Angle Indicator System and includes outline drawings of equipment components.

Martin-Parry Corporation's West Coast Maritime Division Moves to New Office

Of particular interest to West Coast shipbuilders is a recent announcement regarding change of address by the West Coast Marine Division of Martin-Parry Corporation, manufacturers of marine bulkheads, doors and furnishings. Their new regional office and warehouse is now located at 991 Tennessee Street, San Francisco 7. From this headquarters they serve the West Coast Shipyards from San Diego, California, to British Columbia.

The Martin-Parry Corporation is engaged in the design and execution of marine interior decorations, joiner work, bulkheads, linings, ceilings, doors, and furniture.

M. P. du Plessis, Project Manager, Martin-Parry Corp.

At Desk: Karl Anderson, Branch Manager

\w Ship Structure Materials

(Continued from page 100)

d.ft vessels and was later utilized iithe strength decks and superstruc-ties of some of the world's largest psenger liners, including the "Lu-siania," built in 1905. Because of it higher cost and greater difficul-ti in working as compared with rd steel, high tensile steel's use ws generally limited to special ap-pations rather than to hulls. Re-ctly, however, Cor-Ten steel has bn used for the welded hulls of pning-type pleasure cruisers.

(This article will be continued in the \il issue where the use of aluminum nhip construction is developed.)

Reading from left to right: Harold Olson, Eugene D. Shaw, Mel Anderson, and M. A. McQuarrie, of Seattle Marine and Fishing Supply Co.

\w Seattle Cmpany Formed

A new marine supply house in Settle, known as the Seattle Marine ar Fishing Supply Company, was rently formed by four Seattle men, M Anderson, M. A. McQuarrie, Egene D. Shaw and Harold Olson.

The company was formed out of h purchase of the Tacoma Marine Supply Company, Tacoma. Occu-pcy will become effective on April I n the waterfront level at Pier 59 (formerly Pier 8). Temporary of-ics and warehouse have already bn set up at Pier 59.

The Tacoma Marine Supply Com-pny will continue as a separate bness. Officers of the Seattle Ma-rin and Fishing Supply Company ar Mel Anderson, president; Har-ol Olson, vice president; F. A. Le-ord, secretary; and M. A. Mc-Qrrie, treasurer and manager.

Ship Losses

(Continued from page 71)

tact with mines in European and other waters in 1947; of these vessels, 20, of 46,376 gross tons, are known to have been total losses. Amended figures since the cessation of hostilities are 147 vessels, of 707,133 gross tons, of which 55, of 189,473 gross tons, are total losses. British coastal waters have been stated generally to be free of mines, and it is thought that there is little danger to vessels approaching our ports. Mines being cleared from northern European waters, which may have broken away and drifted towards this country are, apart from exceptional cases, considered to be harmless to shipping.

The committee have received authoritative information to the effect that, theoretically, all British and the majority of foreign-made moored mines are designed to be safe after breaking away from their moorings, i. e., as soon as the tension is off the spring retaining the mooring spindle switch. It is possible that, in the case of an old mine, marine growth and corrosion by sea water may prevent the spring from operating, thus causing the mine to remain dangerous. However, mines corrode and leak with age, and therefore there is only a remote risk of a floating mine being a danger to shipping.

The sweeping of moored mines in northwest European waters has largely been completed. There remain areas in the eastern part of the Baltic Sea, the Adriatic and off the coasts of Italy and Sardinia, the Aegean Sea and the Black Sea, where the clearance of moored minefields continues. The magnetic ground minefields off the Belgian, Dutch, German and Danish coasts and in the Baltic, are still dangerous, and it is estimated may remain so until possibly 1957.

"The rising cost of ship repairs, resulting from higher wages and more expensive materials, has continued," the Committee's report states, "and there is, indeed, no indication that a limit has been reached; this fact, combined with an accumulation of unrepaired damage, renders the situation no less obscure than it was last year."

Admiralty Decisions

(Continued from page 73)

may pass, subject, however, to the other rules applicable to such a situation." * * * 33 Mason's U.S.C., 290.

"In obeying and construing these rules due regard shall be had to all dangers of navigation and collision, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger." 33 Mason's U.S.C., 212.

The circuit court, being bound by the facts originally found by the trial court, which concluded the *King* was the overtaken vessel, held that the *Noronic* was entirely at fault for attempting to pass the *King* without its consent. The primary duty of the *King*, being the preferred vessel, was to maintain her course and keep her speed. See Delaware, 161 U. S. 459. The trial court recited in its memorandum that:

"We know of the *Noronic* maneuvering at or near the end of the Northern Pacific Dock No. 4 (Slip No. 1), with the *King* nearby, and we have the two vessels entering the canal piers; but from the various witnesses who ought to have known the different positions of the vessels meantime, and have known what was going on, we have little information. In view of the time of the day, climatic conditions and the fact that there were no other vessels nearby to distract attention, this is at least surprising. * * * Neither crew had a right to navigate their respective vessels with any such disregard for the other. The two vessels were approaching the canal piers at the same time from slightly varying directions. There may be some doubt as to just which one crossed the line of the pierhead first. That is not

necessarily controlling."

It is pretty well recognized that where a large boat is passing a smaller one, such as the boats in this case, the effect of the suction where the smaller boat is in advance, is to first draw it to the rear, and, when the sterns are abreast, to draw the stern of the smaller boat to the stern of the larger. The suction of an overtaking vessel is a frequent cause of collision, particularly if she is larger than the overtaking vessel and the channel is narrow. An overtaking vessel takes whatever risks attend her attempt to pass from cause arising, except from the fault of the vessel ahead. Therefore, the *Noronic* had the burden of showing that the injury of the *King* was occasioned by no fault on her part, but to the contrary, to some fault or neglect of duty on the part of the *King*. Finding as the trial court did that the *Noronic* was at one time the burdened vessel, it becomes incumbent upon the court to conclude that at or about the time of the entering of the pierheads, the *Noronic* was passing the *King*, because by implication, the court felt that the *Noronic* had crept up on the *King* and was passing her although not completely. The fact remains that it was still the overtaking vessel endeavoring to pass the *King* within the piers, which was prohibited by the harbor pilot rules. The "Starboard Hand Rule" which entitles a vessel on the starboard side to the right of way, was not controlling because the rule contains a specific proviso to the effect that when one steamer is overtaking another, the rule is not applicable.

By unusual coincidence, photographs were taken of the two vessels as they passed under the aerial bridge. In the first one, the *King* had just reached the aerial bridge and most of the *Noronic* had passed under it. In the second photograph, they had both just passed the aerial bridge. In this short distance the photographs indicated that the *King* had crept up on the *Noronic*. Both the trial and circuit courts attached little importance to this point because, as I explained before, the *King* was then within the suction of the *Noronic* and was being carried along with it.

The *Noronic* was held to be the passing vessel, which action places it within the charge of negligence in that it negligently attempted to pass the *King* in a narrow and confined channel. For violating the rules governing overtaking vessels, the *Noronic* was held fully liable and the *King* was absolved.

KATZ NAMED ATCO PASSENGER AGENT

Karl E. Katz, veteran Alaska transportation executive, has been named general passenger agent for the Alaska Transportation Company, S. J. Swanson, vice president, announced recently.

Katz, whose headquarters will be at the Seattle office of the company, will assume all duties in connection with the company's entry into the southeastern Alaska passenger service field this summer. Atco recently purchased the former New York-Bermuda luxury cruise ship *George Washington*, which is now en route to Seattle for complete reconditioning preparatory to inaugurating the line's passenger service.

Well known in Alaska and Pacific Northwest transportation circles, Katz was the Northern Pacific Railroad representative in the territory for 24 years. During the war he served with the Army transportation corps as a Lieut.-Colonel and previous to his present post was traffic manager for Pacific Northern Airlines.

Born in San Francisco, Katz has been a Seattle resident since boyhood. He is president of the Seattle Sourdough Club and a member of the Transportation Club, Washington Athletic Club; Nile Temple, A. A. O. N. M. S.; American Legion Post No. 1, Alaska-Yukon Pioneers and Juneau B.P.O.E.

The Earth's Magnetism and its Effect On the Ship and Compass

(Continued from page 81)

ing magnets placed in the athwartship trays.

If compass shows Easterly deviation on Northerly heading or westerly deviation on Southerly heading, place the red or North ends of the magnets to starboard or vice versa.

MEMORY AID: RED STAR N/E W/S

East on North heading or West on South heading Red end to Starboard.

(c) *Head Northeast* and compensate for Coefficient "D" or for Quadrantal deviation, which is due to induced magnetism in the symmetrical horizontal soft iron of the vessel, by *removing all deviation* by means of the Quadrantal Spheres. If compass shows Easterly deviation on a Northeast heading in North Magnetic Latitude, move Quadrantal spheres in toward the compass. If it shows westerly deviation under the same conditions, it indicates that the spheres are overcompensating, so move them out, or replace them with smaller spheres.

NOTE: If westerly deviation is shown when on Northeast heading when spheres are not in position, it indicates unusual construction of the vessel and Quadrantal correctors may have to be mounted fore and aft of the binnacle. It is well to mention Coefficient "E" or Quadrantal deviation which is due to unsymmetrical horizontal soft iron. It is maximum on cardinal points but generally of a minor quantity and is usually omitted when compensating.

(d) *Head West Magnetic and remove half* the remaining deviation by adjusting the fore and aft magnets. This step halves any deviation which may remain (in most cases the remaining deviation will be comparatively small) due to the fore and aft forces of the sub-permanent magnetism of the vessel.

(e) *Head South Magnetic and remove half* the remaining deviation by adjusting the athwartship magnets.

(f) *Head Southeast Magnetic and remove half* the remaining deviation by adjusting the Quadrantal Spheres.

(g) *Head North Magnetic* (preferably alongside the dock) and list the ship.

In North Magnetic Latitude with the red end of the heeling magnet up, if the compass needle moves toward the high side of the vessel when it is listed, raise the heeling magnet until the compass needle returns to its proper position; or, in other words, remove all deviation or vice versa. After removing all deviation lower the heeling magnet about two inches to avoid over-compensation.

(h) *Secure Binnacle*

Tighten the nuts on bolts under Quadrantal Spheres. Remove cranks from operating mechanism of fore and aft and athwartship trays.

Remove cranks from Quadrantal Sphere arms and from reel for the chain of the heeling magnet.

Make a record of the number of, the direction of the red end and the position of the heeling, fore and aft and athwartship compensating magnets.

Make a record of the amount of Flinders Bar used and the distance of the Quadrantal Spheres from the Compass. Close and lock the binnacle door. Your compensation is complete.

(i) *Swing Ship for Residuals*

Swing ship and make observations for deviation on at least every cardinal and intercardinal point, but if time and conditions allow, on every 15°.

(j) *Construct a Deviation Table* and include on it the date, latitude, and longitude of the place of compensation and the deviation on the various headings.

Modern Oil Tanker Design

(Continued from page 83)

hull girder, full scale hogging and sagging tests have been conducted on the welded tankers "Shiloh" (U.S. M.C. T-2 type) in the U. S. A. and the "Neverita" (12,000 DWT. Tons) in Great Britain. The loading imposed were of greater severity than those occasioned by considering the ship on a wave of height 1/20 the length of the ship, and the stresses produced no resultant permanent deformations, fractures, or other structural failures. *(To be concluded in April.)*

A Whaler's Mouth

The slip-way of the Norwegian whaler "Anglo Norse" in Todd Brooklyn shipyard, where she had about 35 tons of barnacles scraped off her bottom and sides, largest such job in shipyard recollection. Barnacles slowed her down from 12 to 5 knots an hour, and made steering difficult.

Shanghai

(Continued from page 64)

Nanking. The Central Bank also administers the export and import regulations and all foreign exchange taken by the commercial banks must be turned over to it. In turn, the Central Bank issues import permits and allocates foreign exchange in payment. The Central Bank of China is followed by four big "Government Banks"—The Bank of China, the Bank of Communications, the Farmers Bank and the Postal Savings and Remittance Bank. These institutions, with many branches scattered over the country, hold almost 90% of all C.N.C. deposits. Then come the foreign banks and in Shanghai possibly 150 Chinese banks—some of them are old established institutions enjoying good reputations, but the majority are just hanging on.

I met many of the men running these Chinese governmental banks, or their foreign departments, and found that they are all youngish men and American college graduates. These men understand the basic problems thoroughly and wish to do all they can to restore China's foreign trade. However, they are up against a lot of very nationalistic minded politicians in Nanking and they have their troubles.

Various government monopolies have taken over much of the private business, such as the sale of tung oil, tea and other export products.

Living conditions in Shanghai, as far as the foreign colony is concerned, are greatly affected by the shortage of dollars. And yet they say that you can buy anything if you know where to look for it and are willing to pay squeeze. At the Cathay Hotel where I stayed, there was no heat at any time—no dollars to buy fuel oil, and coal is very short. Hot water only in the early morning. But food seems plentiful and cocktail parties are plentiful. The people I met were accustomed to taking in two or three cocktail parties and a dinner party a night. Liquor and cigarettes are on the prohibited list, but there seemed to be plenty around. They all live very well with plenty of well-trained servants—but no heat in the houses although the government is expected to relax the rules during winter months. Officially, the Nanking government has decreed an "Austerity Program" with an 11 p.m. curfew, no horse races, etc., etc., but this policy is only vaguely working.

Before leaving for Shanghai, several reassuring friends warned me to stay out because of the anti-foreign feeling which you might run into on the streets. I had absolutely no trouble but you do walk circumspectly. You don't get into an argument with a coolie, there are just too many of them. In calling on bank and business houses along and near the Bund, there is no use using a car because the traffic is too dense and I never did get around to using a peddicab—a three wheeled bicycle with the driver up front. Last year there were very serious riots when the police tried to drive the hawkers and peddlers off the streets—but the peddlers and hawkers are still there. During my stay a theater manager tried to identify the tickets going to speculators and was severely beaten up for his trouble. So organized rackets are there to stay.

China is really in a bad spot today and the foreign groups are very discouraged. On the other hand, China is a very old country and a crisis or two is just a ripple on the pond.

Manila

(Continued from page 66)

Philippine Government had applied to Washington for a loan of $200,000,000 repayable in 20 years, but after careful study the loan has been approved for only $60,000,000 repayable in five years. It is hoped that a new tax bill will be passed early in '48 which will result in increased revenues sufficient to balance the budget and repay our loan. On the other hand, the Manila Railroad Company has a bond issue now maturing amounting to Pesos 30,000,000 which they are unable to redeem. This government operated railway system has been losing large sums of money and the government now claims they have insufficient funds either to continue to carry these losses or to redeem the bonds which are largely in the hands of British bondholders. The railroad may be shut down.

Sometime during '48 the new Philippine Central Bank is scheduled to open. As the name implies, this bank will be patterned after other central banks of the world and in particular after our Federal Reserve System.

On the other hand, the trade picture with respect to the Philippines is definitely favorable. Admittedly they have been buying more goods from us than they have been exporting but there are several favorable factors, and the Philippines was the only country which I visited where there is not now a shortage of U. S. dollars. And their export picture is improving rapidly. Copra exports have been increasing and the Philippines have been helped by high prices ($270.00 a ton a week ago). Sugar exports this coming season will probably exceed 225,000 long tons and should increase sharply during the following years. I was told that canned pineapple production might reach 1,000,000 cases in '48 and double that figure the following year. Several gold mines are already in production and others will follow. In addition, the Philippines will be exporting hemp, hardwood lumber, tobacco, rattan furniture and other products. There is considerable excitement in Manila over the possibility that oil will be found.

The Philippines are therefore favorably situated to earn a substantial amount of dollars through the export of many basic commodities.

The Philippine economy is basically agricultural but some few steps are being taken towards industrialization. Not many but a few of our big industries are establishing plants. Westinghouse is establishing the Philippine Electrical Manufacturing Company with a capital of Pesos 4,000,000. Of this sum Westinghouse is putting up Pesos 1,000,000, local capital Pesos 1,500,000, and the balance is being raised through a bond issue. Westinghouse is also installing a hydroelectric power plant in Mindanao.

During my stay, I had lunch with Frank Waring, Chairman of the Philippine War Damage Commission. Up to the present time approximately 650,000 claims have been received, totalling Pesos 390,000,000. Of these claims 76 per cent are for less than Pesos 1,000 and these small claims total Pesos 102,000,000. The Commission believes that when the deadline on February 29, 1948, is reached that total claims filed will come to 900,000. The auditing and checking of these claims entails a great deal of work and at the present time approximately 15,000 a month are approved for payment. These are all small claims so it can be seen that larger claimants will

(Please turn to page 116)

Crane's Wilmington Office Headed by Roshong

Ray G. Roshong

In order to make their line of packings and seals more accessible to the harbor district, the Crane Packing Company, Chicago, has opened a branch office at Wilmington, California, under the management of Ray G. Roshong, managing engineer. For a number of years they have had an office and store in uptown Los Angeles.

Crane Packing Company manufactures "John Crane" metallic and fabric packings and mechanical seals, and is firmly established in this field throughout the country. Matching the popularity of the line is the popularity and engineering ability of its managing representatives, and right up top is Ray Roshong.

Well known for his part in sponsoring the California State Professional Engineer Act recently approved by the California legislature, Roshong has been active in many movements to raise the standards of his profession. The California State Professional Engineer Act guarantees minimum qualifications for engineering practice within the state and places engineers under a state licensing system giving them full professional status.

Roshong is a member of many professional engineering societies, including the national organization of the American Society of Mechanical Engineers, the American Society of Metals, the American Society of Naval Engineers, the American Military Engineers, and the Propeller Club of the United States. He served as president of the Southern California Section, A.S.M.E., for three years and is at present serving as chairman of their Regional Membership Development Committee. He also serves as liaison officer in the A.S.M.E. in their relations with southern California universities and colleges.

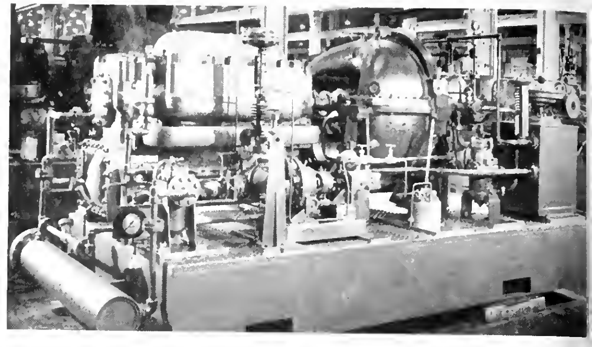
Section of Crane Packing Company's general offices at Wilmington. Left, R. Soza, Marine Sales Dept.; and Nancy Lewis, secretary to Mr. Roshong.

Crane Packing Company's new and modern office and manufacturing plant at Wilmington, Cal., serving Pacific Southwest territory.

Sun Shipbuilding Book

To better acquaint the public with their company, the Sun Shipbuilding and Drydock Company recently published a book giving a pictorial presentation of all their operations. Between these pages may be gleaned a picture of the vastness of their shipbuilding, ship repair and engineering operations as well as their part in the building of oil refinery and chemical equipment.

The book begins with a brief resume of the company's history, starting thirty years ago, followed by descriptions and illustrations of their facilities and operations, with particular emphasis on some of the ships which they have built. The book contains descriptions and pictorial illustrations of their passenger ships, cargo vessels and tankers, steam and Diesel, and their facilities for marine repairs with interesting pictures of unusual repair jobs. Also included are pictures of their various departments and shops, and their engines, machinery and special equipment.



Carrier Corporation's model 18-T-350 centrifugal compressor.

Carrier Corporation Ships New Centrifugal Compressor

The first centrifugal compressor for handling propane on shipboard complete with turbine and already mounted on a compact steel base for easy installation, has been shipped by Carrier Corporation to Warren Petroleum Corporation at Beaumont, Texas.

The 1270 horsepower unit, occupying less than 63 square feet of deck space, will be used aboard a unique tanker that will transport propane in liquid form from Texas fields to the New York City area.

The vessel is the Natalie Warren owned by Warren Maritime Corporation, a subsidiary of Warren Petroleum, which is being fitted at the Pennsylvania Shipyards at Beaumont with 68 huge tanks capable of carrying 1,300,000 gallons per trip. This can be converted into 400,000,000 cubic feet of gas.

The Carrier centrifugal compressor, known as an 18 T 350, will be used in unloading operations. When liquid propane is removed from the ships tanks the resultant drop in pressure converts about 266,000 pounds of each load into gas. The Carrier machine will evacuate this gas and deliver it to a condenser for a return to liquid state. Thus none of the cargo remains in the ship's tanks after unloading.

Manila

(Continued from page 110)

have to wait for a considerable period of time before they can hope for payment. Under the Philippine Rehabilitation Act, Congress authorized the appropriation of Pesos 800,000,000 for the payment of damage to private property resulting from the war, but the Commission must each year apply for an actual appropriation of monies. Application was made for Pesos 20,000,000 to be paid in '47, Pesos 140,000,000 in '48, and they are asking for Pesos 190,000,000 for '49.

(Note for our friends who might have claims exceeding Pesos 1,000—The Act provides that after the payment of Pesos 1,000, all claims must be written off by 2 per cent of the amount approved for payment).

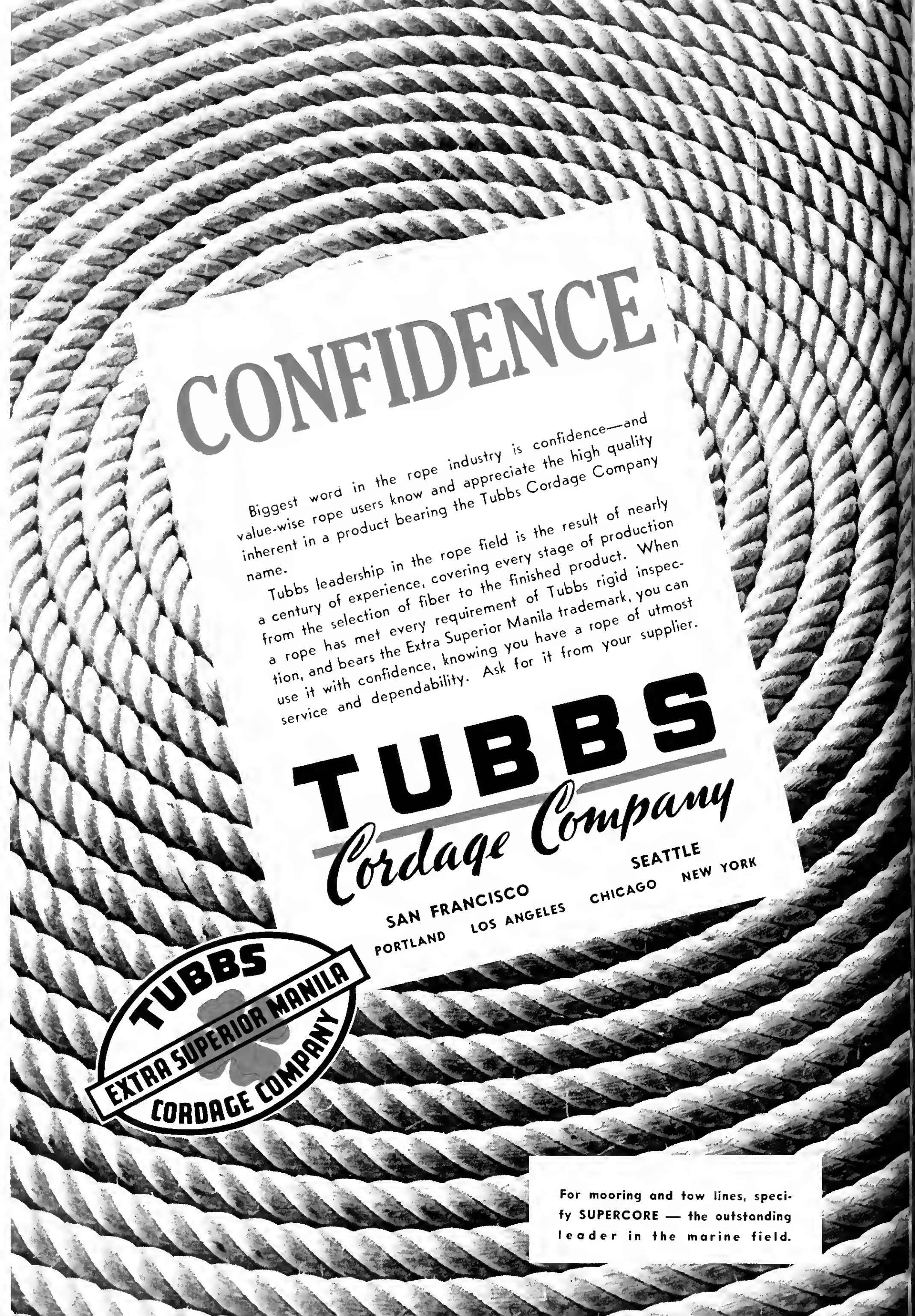
There is one factor which I had not fully realized before making this trip, and that is the predominant influence of the Chinese in the business world of the Philippines. This is resented by the Filipinos. But the Chinese do control much of the wealth, the shops, the copra and hemp industries and all together they are very much to be reckoned with.

And so the Philippines are moving along the road towards recovery, but there is a lot of work to be done and there is no use thinking that they can establish in the foreseeable future a standard of living comparable to our own. But a lot of people are hard at work and the possibilities are great.

"The value of a Merchant Marine to our country, aside from its essential support to the Armed Services, does not accrue from the income that is derived from operation so much as it does in foreign trade development and the protection of our foreign trade from absorption by other nations. It has been repeatedly demonstrated in the history of the United States that we can build and operate ships to prosper in world trade; that we do so in the future as well as now is essential to our welfare and the peace of the world."—*Vice Admiral Earle W. Mills.*

Pacific MARINE REVIEW

APRIL 1948


CONFIDENCE
Biggest word in the rope industry is confidence—and value-wise rope users know and appreciate the high quality inherent in a product bearing the Tubbs Cordage Company name.
Tubbs leadership in the rope field is the result of nearly a century of experience, covering every stage of production from the selection of fiber to the finished product. When a rope has met every requirement of Tubbs rigid inspection, and bears the Extra Superior Manila trademark, you can use it with confidence, knowing you have a rope of utmost service and dependability. Ask for it from your supplier.
TUBBS
Cordage Company
SAN FRANCISCO
SEATTLE
PORTLAND
LOS ANGELES
CHICAGO
NEW YORK
TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY
For mooring and tow lines, specify SUPERCORE — the outstanding leader in the marine field.

Pacific MARINE REVIEW

NES
Publisher

ROCHIE
Assistant
Publisher

LAS MacMULLEN
Editor

ROCHIE, Jr.
Assistant
Manager

AULKNER
Pacific Coast
Advertising Mgr.

J. DeROCHIE
Assistant
Los Angeles

E W. FREIBERGER
Advertising Mgr.
San Francisco

ANGELES OFFICE
5th Street, Zone 13
ne—MIchigan 3129

N FRANCISCO
ne—GArfield 1-4760

iption rates:
, $2.00; two years,
ee years, $5.00; for-
) additional per year;
ies, 25c.

TABLE OF CONTENTS - - - - APRIL, 1948

MEMBER AUDIT BUREAU OF CIRCULATIONS

SAN FRANCISCO HARBOR . . . BY THE GRACE OF GOD

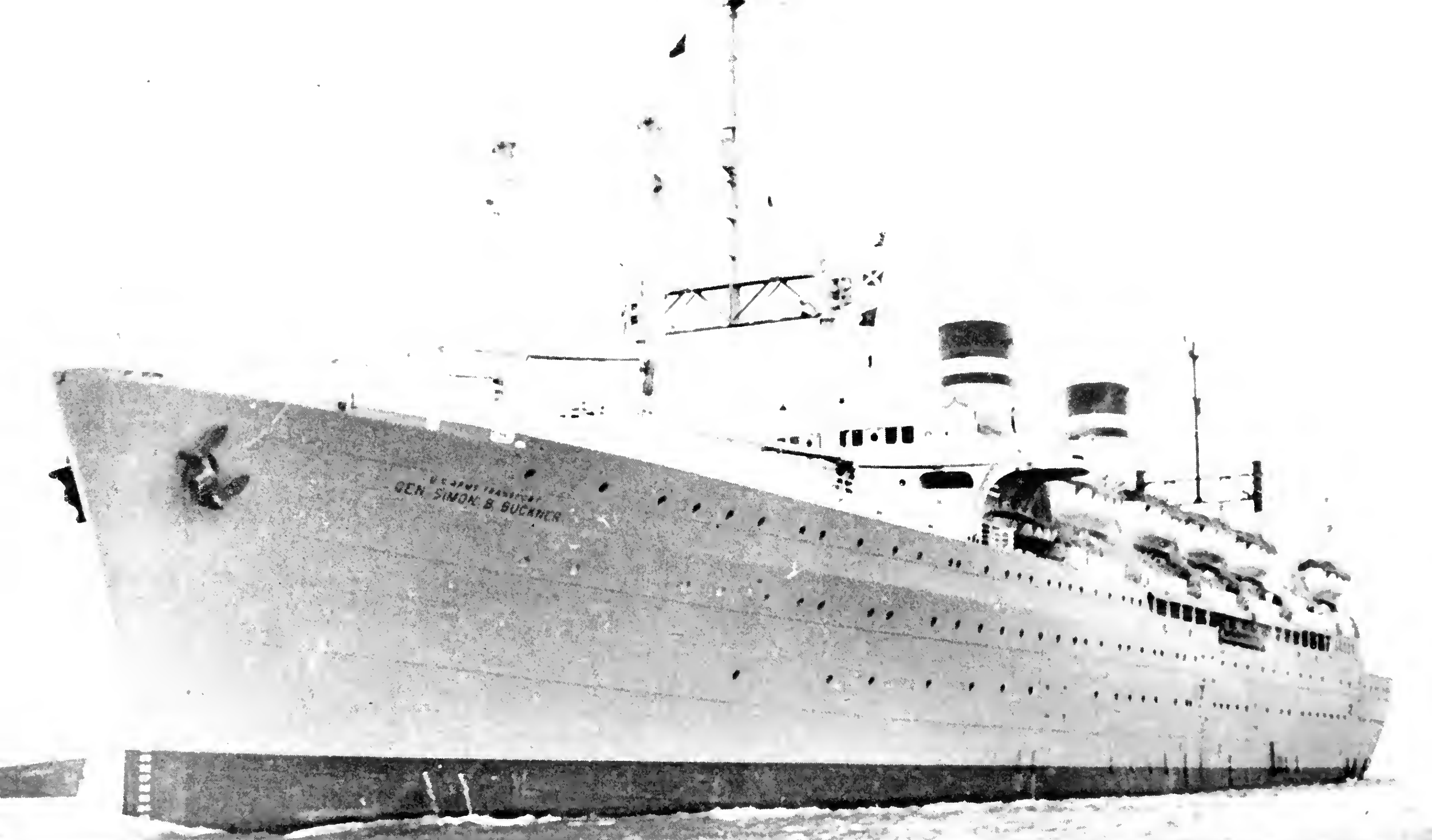
SOME LOVE OUR HARBORS for their natural beauty, or as gateways to victory, but to ship operators and traders they are the means of producing most of their cities' dollars. This may be through a *Lurline's* $250,000 for each turnaround or a fisherman's harvest, or a yachtsman's play. Many a harbor is its city's reason for being, and a major asset of the nation. Four thousand miles of wire is just one item way down on the list of materials that go into the building of a ship like the *Queen Mary*, and every one of us has a stake in every ship and every cargo.

But too many people in port cities lose their "port consciousness," and think of the harbor as an obstacle. Such, apparently, is the thought back of such schemes as the so-called Reber plan for slicing up San Francisco Bay into a series of lakes, with all the playroom accoutrements of dikes and locks. What matter the opinion of Army engineers, or the accessibility of Navy installations when a Great Plan can be preached before civic groups! What matter the agricultural empire of the delta region, or the shipyards and other industries built on the water's edge!

Take the Navy, for instance. The San Francisco Bay Area has one of the world's greatest concentrations of Naval facilities. These include the Supply Center at Oakland, the Naval Magazine at Port Chicago, the Naval Station at Treasure Island, the Naval Air Stations at Oakland, Alameda and Moffett Field, the Net Depot at Tiburon, the Naval Shipyards at Mare Island and Hunters Point, plus all the facilities of the Marine Corps and Coast Guard and the Naval Hospital. These are the kind of establishments which proponents of the Reber plan would shut off along with Bethlehem shipyard in San Francisco and the miles of piers on the Oakland waterfront. More on the Reber plan elsewhere in this issue.

There are other delusions which attract those who "see double but think half" which are important to the maritime industry. One of these is that the steamship people can pay a large part of the bill for national defense by staking the government to a reserve of ships; and by paying for Panama Canal defenses. Another delusion is the proposed St. Lawrence Waterway.

To change a harbor so as to increase its shipping is good. But San Francisco Harbor—by the Grace of God—needs no Reber plan.



THE GENERAL SIMON B. BUCKNER

ONE OF EIGHT P-2's ASSIGNED TO THE
SAN FRANCISCO PORT OF EMBARKATION

The General Simon B. Buckner

First of The Army's Fully Converted P-2 Transports

GENERAL SIMON BOLIVAR BUCKNER fell in battle on Okinawa but a short time ago, but the Army has already singularly honored him by giving his name to one of their finest transports. At the rechristening ceremony recently held in New York, his widow and their son, W. C. Buckner, a cadet at West Point, participated. This 19,000 ton vessel has just undergone an extensive conversion at the Newport News Shipbuilding and Drydock Company's yard in Virginia and is the first of five Army-owned vessels to be completely converted by this firm. The other four are undergoing conversion at the present time.

The *General Simon B. Buckner* was built at Alameda in 1945 at the Bethlehem Steel Company. The vessel is of the U. S. Maritime Commission design No. P2-SE2-R1, is 608 feet in length and is propelled by General Electric turbo-electric propulsion machinery. Her two engine rooms are two separate plants complete with two Combustion Engineering boilers each, and housing the electric generating equipment. The propulsion motors are located in the motor rooms aft of the after engine room, and each motor may be driven by either or both of the two generating plants aboard the ship. Each motor is capable of delivering approximately 10,250 shaft horsepower and operates on 440 volts of three phase alternating current.

PARTICULARS OF THE GENERAL SIMON B. BUCKNER

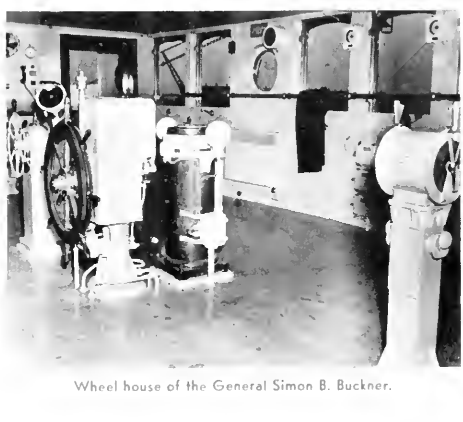
Length over all	608′11″
Breadth, moulded	75′ 6″
Depth, moulded	52′ 6″
Gross tonnage	19,766
Type of drive	Turbo-Elect.
Total horsepower	20,500
Number of screws	2

Upon completion of the vessel for the Maritime Commission, the Navy Department was assigned as her operator and continued in this capacity for the first few months of her career. At this time many features of an attack transport were included aboard the ship, then the *Admiral E. W. Eberle*. Her 'tween deck spaces were utilized to carry the maximum number of troops and she "packed 'em in" just after the war finished, carrying home the divisions from the Pacific Area.

In June, 1948 the ship was turned over by the Navy to the Army to become a part of the peacetime transport fleet, and she was converted in a minor way to accommodate her civilian crew which was placed aboard by the Army. Many of the wartime features were removed to enable her to meet the Army's requirements for a trans-Pacific transport. After a year of this service she entered the Newport News Yard to undergo the present conversion.

The standards and policies of the Army Transportation Corps, Water Transport Division, for permanent Army transports are not only of interest to shipbuilders and ship operators but are also of great concern to the American public. Although the Army is entitled to the privilege of designating its ships as "public vessels" and may operate them as such and without any supervision from other governmental agencies or private regulatory bodies which concern themselves with shipping, such is not the policy. Private operators must comply with the rules of the United States Coast Guard and the American Bureau of Shipping, and it is the policy of the Army to protect its passengers in exactly the same manner as private operators, and further, where deemed advisable.

The principal reason for this conversion of the *General Simon B. Buckner*, as with other Army vessels, is to modify the ships to meet with Coast Guard regulations and to entitle them to full passenger certificates issued by that agency. In complying with the Coast Guard rules, the Army has also met all the requirements of the American Bureau of Shipping so as to permit the vessel to



Wheel house of the General Simon B. Buckner.

retain her hull and machinery classification.

In order to meet with Coast Guard regulations, it has been necessary to insure fireproof construction throughout, proper fire zoning, and provision for all necessary fire detection and fighting equipment of the latest approved type. All life saving equipment has been replaced where necessary, and has otherwise been augmented by new, modern equipment, and additional davits and lifeboats have been installed to increase the boatage capacity to 2,050 persons. The new davits are of the Welin gravity type for all boats, whether nested or single with the exception of the quick operating crescent type davits for the two aluminum motor lifeboats. All hand-propelled and motor lifeboats were manufactured by the Welin Boat and Davit Co., and are as fine equipment as may be found in this line on any passenger vessel today.

Top: Main dining salon of the General Simon B. Buckner.

Center: Cabin class lounge.

Bottom: One of the six-berth cabins.

Considerable re-arrangement and re-assignment of space has been undertaken, and the outcome of this planning has been to increase the cabin passenger carrying capacity of the vessel to 471 persons, or nearly twice her former quota. This re-assignment of space has involved the use of former troop carrying compartments for cabin passengers and crew, and the troop capacity has been effectively reduced. Such a result was necessary, however, because it was not possible to carry a sufficient number of boats on board to accommodate the wartime allotment of troops.

The drab wartime transport of 1941-1945 just got you there and back again and that was all. There was little consideration for the comfort of the passenger—and his safety was insured as much as it was possible to do under the conditions, but the conditions were anything but favorable. The *General Simon B. Buckner* has been purposely fitted to insure comfort and utmost safety for the passengers under all conditions. Peacetime passengers are of a different class than those who sail on transports in time of war. They include military dependents, civilian workers, etc., and a large percentage of these persons are women and children. Additional precautions have been taken for their safety, and furnishings and structure have been carefully designed to be pleasing to the eye, functional, and safe at all times. An extended effort has been made to place rounded edges on all furnishings, on all corners and all protrusions, so that in case a passenger unused to the movement of the ship should be thrown off balance, he or she might experience little or no injury from structural hazards. These furnishings were carefully designed by the Army's Marine Design Section in New York with the cooperation of Turk Products. These furnishings, wall colors, and soft draperies have been carefully blended together in a simplicity of design pleasing to the eye and rendering the cabins and public rooms delightful as well as serviceable.

Besides the staterooms on passenger decks there are several public spaces featured. On the Sun Deck a children's play pen inclosed by a five-foot fence has been installed. On the Boat Deck there is a children's play room, and a small gymnasium located amidships. On the Promenade Deck are the Main Dining Salon and the Main Lounge. The Lounge is built in two sections, each 18 by 60 feet, connected by a Writing Room. Aft of the Main Lounge is the Main Dining Salon which can seat 194 persons. Aft of the Dining Salon is a separate deck house containing a Smoking Room and the Ship's Library. On "A" Deck there is a small auditorium for use

(Please turn to page 101)

Our Future American Merchant Marine*

By Vice-Admiral WILLIAM W. SMITH, U. S. N. (Ret.)
Chairman, United States Maritime Commission

IT IS THE SETTLED NATIONAL POLICY of the United States, through declaration by Congress, that this country shall have a Merchant Marine adequate for its deep sea commerce in time of peace and for its defense in time of war. The United States Maritime Commission is charged with the responsibility for putting such a program into execution.

The policy is sound. It is based upon two important considerations: (1) that the United States has always been, and still is, a maritime nation whose economic welfare depends to a considerable degree upon the importing and exporting of goods and services, and (2) that merchant shipping is a distinctive and essential part of the military establishment in time of war. The policy recognizes that if the United States is to be able to mobilize merchant shipping in time of war, it must maintain merchant shipping in time of peace.

This policy was laid down at a time, 12 years ago, when it was recognized that the American Merchant Marine had declined to the point where it was adequate for neither trade nor defense. As soon as Congress had acted, the Maritime Commission set about the task of rehabilitating our Merchant Marine to bring it up to the standards of the policy set forth in the Merchant Marine Act of 1936.

Those standards are not precise. The Act does not state how many vessels shall comprise the American Merchant Marine, nor what their total tonnage shall be. It does not list the various types of vessels that shall constitute the merchant fleet, nor does it state what proportion of American flag shipping shall be devoted to serving our domestic needs or our foreign trade needs. The Act established the Maritime Commission as the agency to work out such details under the rules and procedures that the legislation provides. The Commission has given a great deal of study to our shipping requirements, particularly our postwar requirements, and has produced a plan which, if funds are provided with which to put it into operation, will provide this country with a Merchant Marine of the size and character which we believe will fully meet the requirements of our national maritime policy.

To determine the proper size and character of the Merchant Marine of a large country like the United States, with its varied interests and highly diversified commerce, is a difficult and complex job. It can never be done to a precise degree. The best that anyone can do

Admiral Smith

is to give careful and detailed study to all the factors bearing upon the volume of cargo to be carried and the amount of competition to be expected, and come up with the best possible estimate. This is exactly what the Commission has done over a period of many months, and we believe that our estimates are as firm as it is possible to make them.

When requested to contribute this article I was asked to forecast the development of our future Merchant Marine "as I would like to see it." My ideas, of course, are one with those of the Commission as a whole. In general, I would like to see an American Merchant Marine adequate to carry our domestic deep sea commerce and a substantial and reasonable portion—say 50 per cent—of our foreign water-borne commerce. I would like to see this Merchant Marine adequate also for our national defense.

What Is Adequate?

When I say "adequate," I mean adequate not only as to the number of vessels, but also as to the types and condition of vessels that make up the fleet. They should be of the types that will meet the particular needs of different trade routes, both foreign and domestic. This holds for dry cargo vessels, tankers, combination passenger-cargo vessels, and passenger ships. If we provide ourselves with such a well balanced fleet for our commercial needs, it will also serve us best in time of war.

Since, as I have stated, the United States must assure itself of adequate shipping tonnage in time of war by

* Prepared by Admiral Smith at the request of Pacific Marine Review Publisher James S. Hines.

maintaining an adequate Merchant Marine in time of peace, we must base our calculations largely upon commercial considerations. Merchant tonnage is different from naval tonnage. You build naval vessels for war only. You design them to the best of your ability to meet the needs of war operation as well as those needs can be foreseen. You build merchant vessels, however, primarily to meet the needs of peacetime operation in competition with the merchant fleets of other nations, incorporating into their design certain features considered necessary to make them most useful in time of war.

Therefore, apart from national defense features to be incorporated in vessel design, the Maritime Commission has been guided by the needs of commercial operators in making its recommendations as to the size and character of the future American Merchant Marine. You cannot overtonnage the steamship business. If it is to operate as a business, it can stand only the amount of tonnage with which it can operate efficiently and at a profit. Whatever extra tonnage may be required by the needs of war must be provided outside the peacetime operating Merchant Marine. That must be accomplished in two ways: (1) by maintaining a reserve fleet of ships which, in the opinion of our military experts, is sufficient in size and composition effectively to augment the operating fleet in time of war; and (2) by maintaining, under normal peacetime conditions in the maritime industry, a shipbuilding plant which can be rapidly expanded to assume the extra burden of wartime shipbuilding.

The reserve fleet is an accomplished fact. It was established under authority of the Merchant Ship Sales Act of 1946, and upon the expiration of that legislation it will be "frozen" at a certain number of vessels of certain types as recommended by the Joint Chiefs of Staff. Maintenance of adequate shipbuilding schedules to keep our shipyards in business on a scale adequate to permit their expansion to handle a wartime construction load is quite another question. It is a question which can be answered only by our decision on the whole future of the Merchant Marine.

New Construction

Ship construction now to provide vessels needed at once by the Merchant Marine, and a steady schedule of construction in the future to provide replacements and keep our fleet modern, are definitely a part of the Maritime Commission's plans. It is a well known fact that our shipbuilding industry is now facing virtual extinction, while foreign countries have expanded their shipbuilding facilities enormously since the end of the war. This is a serious defect in our national defense program, because if our shipyards are allowed to become idle we will lose not only the yards but the craftsmen on whom we must depend as the nucleus from which to expand in time of emergency. If those people are forced to abandon their trades and take up other work we cannot expect to find them on call the instant we need them.

Between 1938 and 1947 the number of vessels in our Merchant Marine increased about 200 per cent and their total tonnage increased about 270 per cent. Of the 4,202 vessels aggregating 44,203,400 tons deadweight comprising the fleet as of June 30 last, only 1,139 were of the long-range type built just prior to or during the war. They represented 27 per cent of the number of vessels and 32 per cent of the deadweight tonnage of the fleet. Of the total of 4,202 vessels, 2,581 were of emergency war-built types and 482 were of pre-war types and mostly obsolete.

Despite the tremendous increase in the fleet due to wartime construction, less than a third of it, comprising the long range types, could be considered in drawing up long-range plans for the Merchant Marine. Only a relatively small number of emergency type vessels have been purchased by American operators, and the pre-war vessels, most of which are over 20 years old, will not be of service much longer.

The Merchant Fleet

The Maritime Commission recommends that the post-war American Merchant Marine consist of 1,044 vessels totaling 11,393,000 deadweight tons. This is contrasted with a fleet of 1,422 vessels aggregating about 11,800,000 deadweight tons, operated as of June 30, 1938. It is recommended that 144 new vessels are required, while the remainder of 900 could be made up of existing vessels built by the Maritime Commission and others.

Of the total of 1,044 vessels, it is believed that 491, aggregating 5,132,000 deadweight tons, should be in foreign trade in order adequately to serve the 31 trade routes laid out by the Maritime Commission. This would place the remaining 53 vessels, totaling 6,261,000 deadweight tons, in the domestic trades, including coastwise, intercoastal and non-contiguous.

In making its plans the Commission has given special attention to the need of passenger ships. In 1939 there were 127 passenger-carrying vessels, with passenger capacity of 38,357, operating in our foreign and domestic trades. Now there are only 34 such vessels, with passenger capacity of about 7,000, under the American flag. None of them is in the domestic trades, and the only first-class passenger liner we have in the North Atlantic is the *SS America*. Our passenger-carrying ship requirements are estimated at 96 vessels, of which 58 must be obtained through new construction. The new ships would replace those now obsolete or which will become obsolete within the next five years.

The Merchant Marine Act of 1936 was passed, and the Maritime Commission set up to administer it, for the purpose of effecting a complete rehabilitation of the American Merchant Marine. The Commission set about the task of accomplishing that objective by building 50 ships a year for a period of ten years, to add 500 new vessels to a fleet that was fast becoming obsolete. When the war came that program was lost in the mad scramble of emergency ship construction which produced more than 5,000 vessels in five years.

Today, we are faced not only with the old problem of providing ourselves with an adequate, modern fleet, but also with the new problem of what to do about the vessels we have on our hands as the result of the war construction effort. These vessels have created a mental hazard

(Please turn to page 103)

George Barr

Serving The Merchant Marine

By GEORGE BARR

General Electric Company

Born in Paisley, Scotland, George Barr came to this country as a young boy and started working as a machinist for General Electric in Schenectady in 1907. He has been with the company for 28 years in the San Francisco engineering division as turbine supervisor and marine superintendent. During the past two years he has been consultant for the Federal & Marine section with San Francisco headquarters.

A year ago Barr received General Electric's highest recognition, the Charles A. Coffin Award. Recently the U. S. Navy awarded him their "Certificate of Commendation" for services while acting as service and installation engineer in the West Coast offices of General Electric.

THE MERCHANT MARINE OF THE UNITED STATES derives its strength from all its components—the operators of the Merchant fleets and from the industries backing them up. The highly competive nature of the merchant shipping business, not only between nations but within the ranks of the fleet operators, calls forth the highest degree of operating efficiency in order to maintain the standards under which the American Merchant Marine is operating today.

One of the prerequisites for a profitable merchant ship is that it "keeps sailing" with time out for maintenance and repairs in excess of normal port time kept to a minimum. The experienced operator knows that this can best be accomplished by an organized preventive maintenance schedule by which lay-up and repairs can be avoided before breakdowns occur.

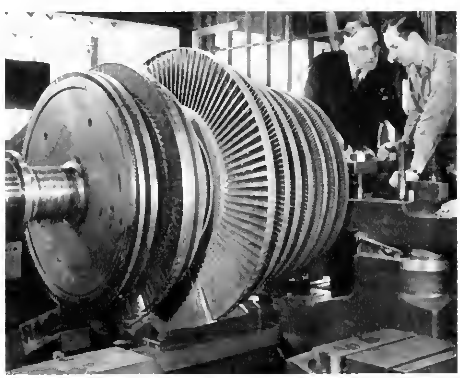
General Electric Company has been a supplier to the Marine Industry for many years and, like all other patriotic groups, has a feeling of pride and responsibility toward our Merchant Marine. Over the years the company has built up a marine service organization which today is nationwide in scope and provides a complete plan for maintaining General Electric shipboard apparatus.

Warehouse Stock of Marine Renewal Parts

It is well known that, during the first and second world wars, mass production of ships in the United States was made possible by standardizing design but it is not commonly known that a frozen design of machinery has made it possible to repair ships faster than ever before.

Before the first world war practically all ships and all machinery for them was custom-built and practically all of different design; therefore, each ship was obliged to carry a heavy load of spare parts or be laid up while new parts were being manufactured.

Since the innovation of standard types, it is possible to procure renewal parts from vendors' warehouses. To maintain mechanical and electrical parts for a vast number of ships is a difficult task but it is being done and it is just as easy to procure parts in the West as it is on the Atlantic seaboard. As a sample of this service we would cite a recent case of a seriously damaged vessel. The engine room was flooded to sea level and all General Electric machinery was submerged. Turbines and generators were rusted beyond recognition and all electrical equipment, under water for months, was practically ruined. But this machinery was reconditioned with material from the local warehouse in San Francisco and not a single part had to be shipped from the East. A new main turbine rotor was installed and all internal parts of the turbine were replaced but the interesting thing is



George Barr and C. A. Enlow, turbine leaderman at General Electric's Service Shop, San Francisco.

that the multi-stage rotor and its diaphragms, packings, bearings, etc., fitted the original turbine casing as they would have fitted in hundreds of other turbines of the same class. The small turbines were beyond repair and had to be replaced with new units taken "off the shelf." The point is that they were on hand and if they, or the major parts that went into this repair job, had not been available the ship would have been set aside for an indefinite period.

Another sample of the value in being able to procure Standard parts on a moment's notice is the recent program of recommissioning a large group of laid-up tankers and cargo ships on both the East and West coast. Some of them had been laid up on account of heavy damage; yet none were delayed through inability to procure renewal parts.

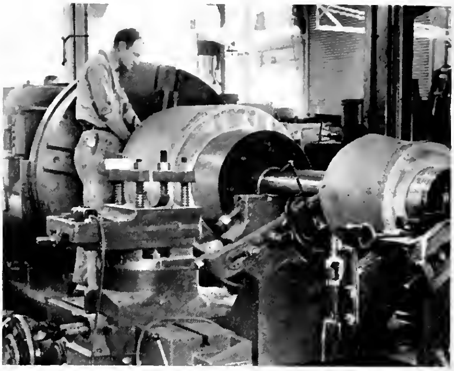
Unit Exchange Plan

These plans cover immediate exchange of AC auxiliary motors, air coolers, turbine rotors, both main and auxiliary for modern ships, and in certain small types, complete turbines ready to install. The system has been inaugurated to eliminate the loss of time while waiting for repairs or the cost of purchasing new equipment to avoid the loss of time. Worn or damaged units are accepted in exchange for reconditioned units, which carry a 90 day guarantee, and credit allowances are made for the returned units.

This exchange plan is being shown at its best in the aforementioned revival of the laid-up tankers but active ships are also being served with a minimum of delay.

Service Shop

Service shops are maintained for the shoreside repair of mechanical and electrical apparatus and for the repair of electric meters, instruments, relays and electronic equipment. Skilled service men are made available to check and recalibrate instruments, meters, and to adjust relays, etc. on shipboard. To enumerate the functions of the electrical department of the Service Shop would consume all of the space which has been allotted to this paper; suffice it to say that the Service Shop must be fully equipped to make electrical repairs of any nature and in any capacity. The machine shop must be tooled to handle all mechanical repairs including welding, metal spraying and other specialized processes; however, a separate section must be devoted to turbine repairs in all sizes up to 12500 HP.



Setting up, in the 60-inch Niles lathe, to turn and grind the commutators for generator and exciter.

One of the most important operations in the Service Shop is the dynamic balancing of all types of rotors in all speeds up to 10,100 R.P.M. and in all weights from 24 lbs. to 25,000 lbs. This is being done with every assurance that the rotors will run in perfect balance, and the secret of this success is in the preparation of rotors for the balancing operation. In other words, the cause of unbalance must be determined and corrected before attempting to rebalance a rotor. This phase may consume two thirds of the overall time. It is, by far, the most difficult part of the operation but it enables the ship repair people to reinstall a rotor that they can rely upon and it is the new approach to an old problem that has always been a doubtful operation.

Marine Service Engineers

Apart from supplying the necessary materials, the

(Please turn to page 91)

General Electric Marine Service Engineers

Standing, left to right: E. A. (Ed) Reber; H. J. (Bob) Brown; A. S. (Andy) Jacques; J. (Jack) Donahoo; E. J. (Ernie) Cambou; C. R. (Ray) Elfers; W. R. (Bill) Hall; J. K. (Johnny) Leithold; J. R. (Joe) Breuer, and R. E. (Ralph) Seeman.

Seated, left to right: J. (Jack) Parker, L. C. (Lynn) Taylor, C. L. (Whitey) Knight, D. L. (Don) Watts, J. P. B. (Johnny) Clark, J. M. (Jimmy) Anderson, and J. R. (Russ) Schneider.

Interior Designs for the S. S. Uruguay

Formerly with the Department of Interior Design, U. S. Maritime Commission, William F. Schorn, architect, Marine Interior Designer, did the interior designs for the Uruguay.

THE S. S. URUGUAY, a 20,000 ton vessel was constructed in 1928. Originally named the *California*, she saw service under the flag of the Panama-Pacific Line. In 1936, she became the *Uruguay* as one of the three "Good Neighbor" ships operated between New York and the East Coast of South America, by Moor-McCormack Lines. Her length overall is 601′ 1 ¼″, breadth molded 80′ 0″ and depth molded to Shelter Deck is 52′ 0″.

During the war the *Uruguay* became a troop transport and distinguished herself in every theater of the war. Her missions completed, the United States Maritime Commission decided to restore her as a passenger vessel for operation by Moore-McCormack in her old route. The commission awarded contracts, therefore, to Joslyn and Ryan to prepare hull and engine specifications; to William Francis Schorn to prepare joiner, furniture, furnishings, deck covering, lighting and painting specifications. Schorn was also retained to design and supervise the interior construction. Federal Shipbuilding and Dry Dock Company was the successful bidder and was commissioned to reconvert the vessel.

While her hull and machinery needed considerable repair and replacement, the major task of reconversion was in the interior accommodations, which naturally had suffered much from war use. It was, of course, not possible to restore her to her previous pre-war condition, because of laws and regulations which did not exist when she was originally built. Senate Report No. 184, the Safety at Sea requirements of the United States Coast Guard, the sanitation and rat proofing requirements of the United States Public Health Service, all required that in reconversion, the vessel be made different, better and safer than she had originally been. A considerable amount of structural steel was found by the American Bureau and the U. S. Coast Guard to be defective. This meant that in replacement, much of the interior joiner work, deck covering, lighting, etc., had also to be removed. In view of these circumstances, the interior accommodations are quite different from the original vessel and are, for the most part, new and modern in design concept and execution. The interior designs had to be developed in terms of incombustible construction, new fire control compartmentation and the new requirements for rat proofing.

Between the time she left the merchant trade for war service and her return to Moore-McCormack now, there have been many changes in union agreements. For one thing, a larger crew will operate the vessel than previously. Also crew quarters must be larger and better. This increase in the amount of crew space could only be achieved by encroaching on passenger spaces.

The problem, therefore, was to provide adequate view and officers quarters and to provide for as many passengers as the vessel formerly carried, but in less space and within the limitations of all the new governmental requirements.

The liberal use of indirect lighting and continuous trough lighting, both extravagant of power, was rigidly curtailed. In their place, pleasant and efficient light diffusion was obtained by means of flush ceiling units which contain a filter of sheet glass, fibrous glass and phenolic resin. This filter diffuses the light, shields the

Shown above is the track chart of the Uruguay. Scale model of the vessel moves on a track and is located at noon every day at the proper place on the track.

light source and absorbs very little of the light rays.

Existing radiators were retained, but by design made a concealed or integral element of the designs. Existing ventilation grille locations and controls were also kept and made as inconspicuous as possible and in many cases due to the design of the ceilings in the public spaces, were developed of marine fireproof materials to hold down noise levels. In the *Uruguay*, the interior architect planned for the public address and music broadcast systems, to employ numerous and small loudspeakers, generally concealed behind ceilings, in place of the more usual installation of a few, large speakers. This method is ideal for keeping an even balanced sound level. For example, in the *Uruguay* dining rooms, one hears music clearly in any part of a room and always of the same soft volume.

Special paints were developed for the vessel which are salt spray proof, mildew and bacteria proof and have a tough wearing surface. The designer also developed a special textured paint employing fine asbestos powders for fillers. This material was created to achieve several purposes; first, to cut down sound "bounce" from the hard steel o. bestos walls, and second, to provide a flexible wash finish which would be soft in appearance to serve -elief and as a foil to all the hard smooth metallic surfaces which are inevitable in marine interiors. Most of the ceilings and many of the bulkheads are coated with this material in various stippled and striated textures. All paints were formulated for color in the designer's office, manufactured and sent to the vessel ready for application without the necessity for mixing tints in the shipyard. This method proved invaluable to the shipbuilder in touching up, repainting due to damage, etc.

The design of staterooms and their furniture on a vessel the size of the *Uruguay* is a serious factor. In spite of the varying sizes and shapes of staterooms, the furniture must be standardized to a few simple basic units in order to achieve economical factory runs, to keep excessive costs down. These units were developed to practical module sizes to suit all conditions. All such chests and cabinets on the *Uruguay* are built-in as an integral part of the staterooms and are rat proof, vermin proof, with plastic tops which are acid and blister

First class dining room of Uruguay.

First class lounge of Uruguay.

proof. All units are equipped with long-wearing anodized aluminum sea rails. Hardware and sea rails are designed so as to make it impossible to employ them as bottle openers (a favorite passenger pastime).

The central feature of the staterooms is the chiffochest, to provide a triple purpose space saving item which serves as a writing desk, dressing table and storage chest.

The beds are dual-purpose units in that they provide a sleeping surface at night and a three person sofa during the day. Hence all staterooms are sitting rooms by day and bedrooms at night.

Special study was given the chairs in staterooms and public spaces, insofar as the center of gravity of the units is concerned. They are designed so as not to tip even when the vessel is rolling or listing considerably.

All furniture and furnishings in the passenger spaces on the *Uruguay* were specially designed and created for the vessel and were manufactured of materials and by methods developed over a period of years and found to be practical and durable in a marine way. Advanced modern furniture models now finding popularity on land were shunned due to the fact that they were either considered too weak in engineering for marine use, or not sufficiently stable for marine movement.

The Fiesta Room

This room functions as a lounge and card room during the day and a night club at night. There is at the aft end an orchestra platform and in the center of the room, a dance floor, covered during the day by a dusty-green sculptured carpet.

The outstanding architectural feature of this room is the treatment of the dome and the structurally necessary stanchions. The tapered stanchions were evolved in order to lighten their bulk at the deck and still enclose brackets at the ceiling. The effect gained by this taper is one of height. The dome was architecturally treated with mirrors in order to give more depth to the sides and to add to the illusion of height. Flanking the stanchions are grilles, which serve as ventilation terminals and add interest. This dome is flooded with lights and serves to illuminate the dance area.

From the pale yellow of the ceiling to the deep slate blue of the banquettes, a well balanced fully ranged color scheme has been sought, striving to attain an easy air of gayety.

The windows are handled as a continuous band with venetian blinds in off-white, accented by embroidered horizontal striped curtains. The curtains are reminiscent

Top: Lounge lobby of the Uruguay, off first class smoking room and promenade deck.

Center: Cabin class smoking room.

Bottom: Typical passenger stateroom.

Passenger stairs of Uruguay.

of the Mexican serape, with a rose background, horizontally striped with yellow, black, green, red and grey. At the center of the window wall is a built-in banquette of a slate blue nubby textured fabric, embroidered on the seat and back with a ribbon-like stripe of rose, grey and white. Flanking this banquette are ferneries running the entire length of the room. The greenery adds to the tropical feeling of this room.

Lounge Lobby

The lounge lobby, which serves as an ante-room to the Fiesta Room is connected with it by four-fold fully glazed doors. It is treated in contrast to the lounge with a few "recall" colors from the Fiesta Room. This room is long and narrow and in order to improve its proportions, the inboard bulkhead is fully mirrored. Apparently coming out from the mirrors is a semi-circular arrangement and a semi-circular coffee table, both of which are flanked by "half" lamps. The effect is that of a large circular arrangement of furniture. In extreme contrast to the Fiesta Room, the lounge lobby bulkheads and ceilings are treated in varying shades of grey, from a deep slate grey ceiling and one bulkhead, to a light grey treatment at the doors.

First Class Smoking Room

The first class smoking room is "H" shaped, with the bar and a row of tables between two long cocktail room light areas. The bar which is faced with brown tufted leather, is long and commodious; the back bar of simple design is fitted with the necessary marine fiddle-boards for holding bottle and glasses in place when the ship is in motion. Over the back bar is a clear mirror wall, in which the skyline mural is reflected in excellent perspective for those at the bar.

In the outer area an approach to streamlining was used in order to tie in the complete "H" shape of the room. The brown ceiling continues down the bulkhead in a continuous plane. A contrasting plane of grey is placed in front of this, almost to the ceiling, with a wrap-around effect. On the outboard side, curtain pockets cut in a tapered shape, surrounds the small windows in order to obtain the effect of greater fenestration. At the inboard corners at the four entrances of the room are mirrored recesses to obtain greater width in these narrow

(Please turn to page 91)

Early San Francisco Shipping

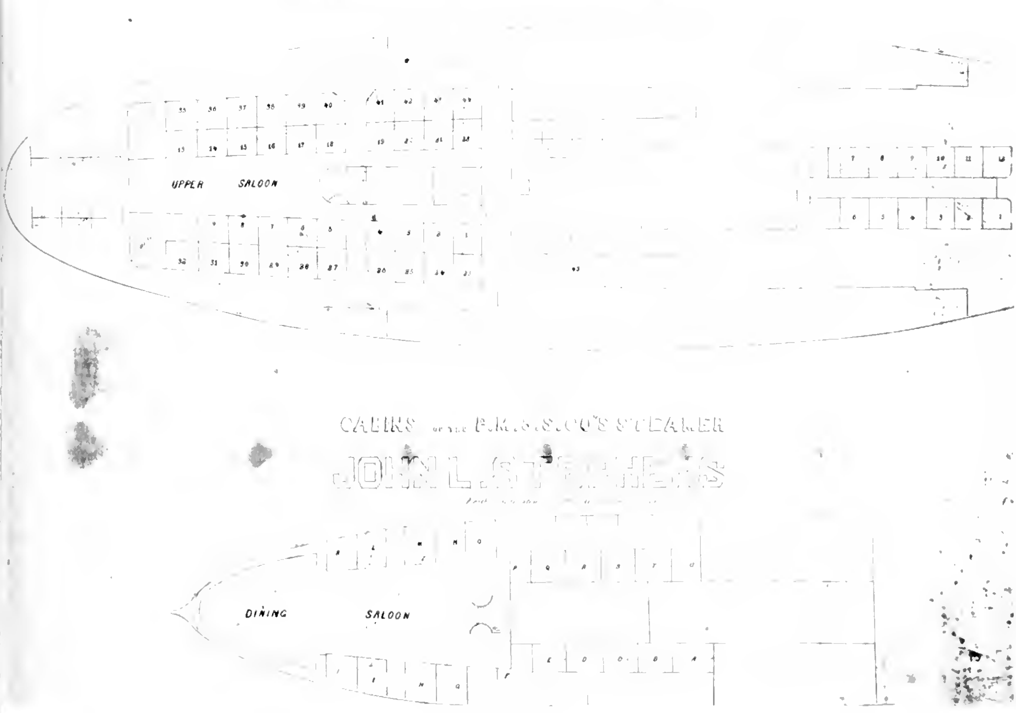
Early Steamers

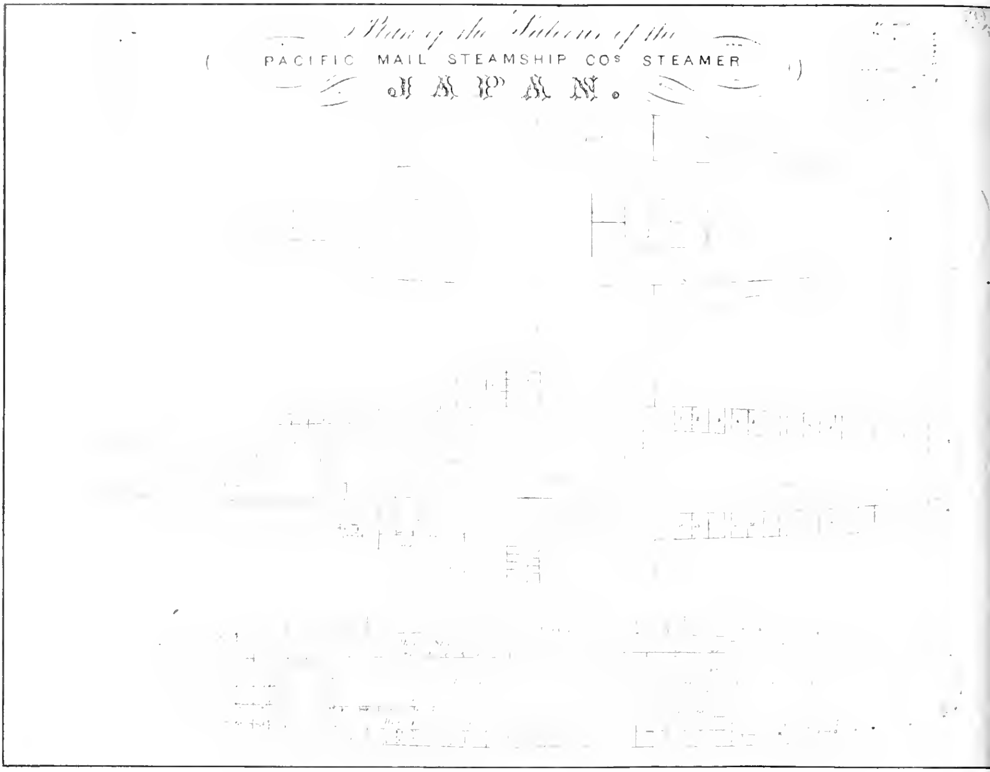
By [illegible]

IN THE FIRST INSTALLMENT of this series we referred to an Act of Congress passed on April 12, 1848, authorizing liberal mail contract for any firm that would establish and maintain a regular steamer service between New York and Portland via Isthmus of Panama. Pursuant to this act the Pacific Mail Steamship Company was formed by New York interests. This company almost immediately ordered six steamers from Webb, the famous New York shipbuilder. The first three of these vessels were to make the run out to the Pacific Coast via Magellan Straits and the last three were to work on the Atlantic Coast between New York and Chagres. The contract called for a monthly service.

The three vessels to run on the Pacific Coast side of this mail route were S. S. *California*, S. S. *Panama*, and S. S. *Oregon*. They were small by modern standards but quite large and spacious for the date of their delivery.

Each was 200 feet long between perpendiculars. Beam amidships on deck was 33 feet for *California*, 32 feet for *Panama*, and 34 feet for *Oregon*. The great side paddle-wheels with their housings extended outboard of this beam. Registered measurement was 1,050 tons for *California*, 1,087 tons for *Panama*, 1,100 tons for *Oregon*. Depth of hold was 20 feet for *California* and *Oregon*, and 21 feet for *Panama*. The largest trans-Atlantic steamers built about that time were Cunarder *America*, finished in 1848 having a length of 251 feet and a registered measurement of 1,825 tons, and the Collin's Line *S. S. Atlantic*, finished in 1850 with a length of 282 feet and





Deck plans of Pacific mail steamer Japan. It is interesting to note the use being made of the space in the sponsons ahead of the side wheels. On the one deck this space is occupied by a cattle pen, barber shops and dressing rooms, and on the main deck, by lifeboats. The small print in the upper corners of this picture read as follows:

Cargo Capacity	
Lower Hold forward	251 tons
Lower Hold aft	194 tons
Orlop Deck forward	285 tons
Orlop Deck aft	318 tons
Cargo Deck forward	418 tons
Cargo Deck aft	520 tons
Baggage Room	122 tons
Mail Room	27 tons
	2135 tons
Coal Bunker lower Hold	942 tons
Coal Bunker Cargo Deck	496 tons
	1438 tons
Water Tanks	18500 gals.

Accommodations		
Dining Saloon	30 Rooms	98 Berths
Ladies Saloon	20 Rooms	92 Berths
		190 Berths
After Steerage	9 Rooms	26 Berths
Standees		120
		146
Women's Steerage	13 Rooms	78
Standees	17	51
		129
Men's Steerage	18 Rooms	105
Standees	78	234
Standees—Main Deck	98	294
		633
Recept. First Class		190
Recept. Steerage Aft		146
Recept. Steerage Aft		762
		1098

a registered measurement of 2,860 tons.

Hull materials on the *California* and her sisters were the best live oak, white oak and cedar. The bottom was copper sheathed throughout. As originally rigged, these vessels were barkentines with three masts, a straight stern, and no bowsprit.

The power plant was built at the famous Novelty Works of New York City, then owned by Stillman, Allen & Company. If you wanted a large marine steam engine today, would you go to a novelty shop? One hundred years ago such engines were still novelties. Indeed, a power plant of the type used in these vessels would certainly be a novelty if installed in an ocean-going steamer today.

Boilers were of the flue type, coal burning with strong natural draft induced by tall smoke stacks, and using salt water. They were equipped with a pipe system for blowing out salt deposits and were guaranteed to generate steam at 10 pounds pressure above atmosphere.

Engines were single cylinder 71 inches bore and eight feet stroke driving the paddles through an overhead

(*Please turn to page 95*)

t's Time Reber Plan Agitation Was Dropped

(An Editorial)

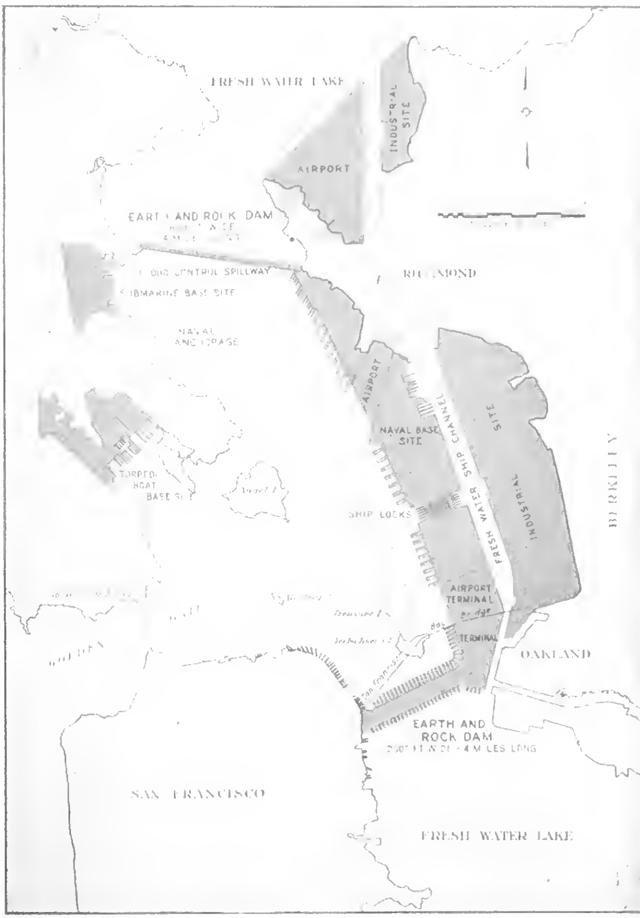
Rarely does a debater admit being convinced by his opponent of the error of his cause. This seems to be so also between nations, political parties, and friendly neighbors. So it is not strange that proponents of great industrial schemes hold fast to their theories. The public, however, does not always have authoritative sources of information for its guidance.

The so-called Reber plan for San Francisco Bay is one that permits of sound engineering analysis, and the preponderance of opinion is that the scheme is fantastic in the extreme, increasing the very problem it pretends to solve, and presenting new problems and dislocations of industry and agriculture—at a cost of billions. Happily, city officials in East Bay cities are presenting to the public the reports of the Army Engineers and those of private engineering consultants and an enlightened public will weigh the effect of the plan on their Area.

The Reber plan contemplates the erection of dams across San Francisco Bay to form fresh water lakes north and south to stop salt water encroachment on agricultural lands, create new urban property and provide added bay-crossing facilities. As the drawing shows, it would create a new shoreline for the east side of the Bay and cut off from free access to the Bay all of the busy Oakland waterfront, and that of Richmond, Berkeley and Alameda. It would cut off the Oakland Estuary with its shipping and its shipyards, including Moore Drydock, United Engineering, General Engineering and Drydock, and Bethlehem Steel's two Alameda yards, at one of which (owned by the Maritime Commission) a wartime fleet of P-2s was built, including the new liners *President Cleveland* and *President Wilson*. The Coast Guard base is also on the Estuary, and along the Bay front is Naval Supply Base, the Army Base and the cargo piers of the San Francisco Port of Embarkation. In the north end of the Bay are many industrial port towns, the great sugar refinery at Crockett, the Benicia Arsenal, and the Mare Island Naval Base. In the South Bay Area on the San Francisco side are many steamship company piers, Bethlehem's great shipyard, and the Hunter's Point Naval Base, as well as lumber and cement ports and the main salt industries of the West. Access to all of the above would be through one set of locks which it would take at least two hours to pass, placing burdens of time and expense on all vessels.

It is with the hazard to the shipping industry and to national defense that this publication is mainly concerned. We be-

The Reber Plan's obstructions in San Francisco Bay
The joint Army-Navy Board says "No"



lieve that the cities, the entire West and the nation should effectively condemn the project.

We have called the scheme fantastic, and engineers have so reported. But it is upon the Corps of Engineers, U. S. Army and the Joint Army-Navy Board, that we rely for explicit condemnation of the project for its effect on other phases of industrial life than shipping.

Damage to the Golden Gate and Navigation

The adoption of the Reber Plan would seriously impair the role of San Francisco as one of the major ports of the world, since it contemplates the isolation of all of the facilities existing at present in the middle and outer harbors of the Port of Oakland with consequent economic loss and the necessity for the construction of substitute facilities and because it would have a definite deleterious effect upon the San Francisco Bar. The objections to the plan voiced at the public hearings included the following:

The Reber Plan, by eliminating 85% of the tidal flow through the Golden Gate, will ruin the ocean entrance by allowing it to be closed by beach and bar, and will thus convert one of the major ocean gateways of the world to an experimental status.

Through the elimination of tidal scour, it will greatly increase the future maintenance of interior waterways.

It will place a burden of expense and delay on all shipping endeavoring to serve terminals, existing or prospective, at any point other than within a relatively small area in north San Francisco Bay which would be left on salt water.

Coast and Geodetic Survey Chart, Serial 484, gives a graphical presentation of the extremely intricate pattern of the tidal currents in San Francisco Bay. It can be readily seen that any interruption in these tidal currents, which throughout the years have established equilibria of water depth with the configuration of surrounding topography throughout the Bay area would result in silting, and substantial quantities of money would have to be spent annually for the maintenance of navigable channels, for the northerly arm of the bay alone, this was calculated in 1933 for a proposed saltwater barrier at Richmond at $25,000 per annum during the first 25 years below the barrier and $175,000 above the barrier.

Transportation

Traffic studies by the Board indicate that none of the terminal areas in San Francisco offer a street pattern, even when improved within practical limits, that could absorb, at a maximum, more than four additional lanes of cross-bay traffic in each direction. So, while the proposed super freeway would provide some 32 highway lanes, the bottleneck of the city streets would prevent use of more than a small number of them; and while the dam could carry many lanes of traffic, it would provide no more lanes that could be used, than a bridge at the same location.

In order to bring trains on to the mole consideration must be given to the ruling grade. The preferred railroad grade is 0.5 per cent. However, assuming a 1 per cent maximum permissible grade with the channel clearances indicated in the plan as submitted, a tunnel a little less than four miles long (approximately the width of the Bay at this point) would be required in order to carry the trains under the navigation channel. Such a tube would start its descent in the vicinity of Peralta and 7th streets in Oakland and would come to grade on the mole about half way across the Bay. So the main lines of the railroads would make use of only half of the surface of the mole, and, in order to clear the navigation channel, would have to cross a major portion of the Bay in costly tubes.

From the above, it is concluded that the Reber Plan would offer no greater relief to automobile vehicular congestion than a high-level bridge at the same location, but that it would provide railroad connections into the City of San Francisco, although at great expense.

Sanitation

The transformation of the upper and lower arms of the bay into lakes would present a very expensive problem from the standpoint of sewage and waste disposal. At present, the communities and industries contiguous to the bay area secure a great deal of natural purification of their wastes by virtue of the large quantities of water available for dilution by the existing tidal prism. If this tidal prism were no longer available, additional treatment would be necessary.

A change-over from a tidal system to a stationary lake system for disposal would require alteration of the existing regional scheme of bringing sewage effluent to a few centralized points where tidal factors are most favorable for dispersion. It can be expected that, as contrasted with the few regional sewage-disposal plants around the bay, now envisaged, the shores of the lakes would be dotted with a large number of exceedingly complex sewage-treatment plants, consuming large areas of land that would adversely affect a large surrounding area.

Water Conservation

The State Department of Public Health affirmed that the "construction of dams across San Francisco Bay to create large inland fresh-water lakes would greatly magnify the sewage-disposal problems of all the communities around San Francisco, extending at least from Antioch on the east to San Jose on the south and to San Francisco on the west. The effect would reach inland as far as Suisun and Fairfield and possibly to Stockton, and as far north as Napa."

None of the claims of water conservation by the proponents of the Reber Plan have been documented by mathematical analysis or engineering study. Separate studies by the Board and Examination of the reports of the State and Federal agencies confirm the fact that the Reber Plan would require large quantities of fresh water from surface storage elsewhere in order to maintain the upper and lower arms of San Francisco Bay as fresh-water lakes.

The Board concludes that the Reber Plan would misuse fresh water and would retard the full future economic development of Northern California.

Land Reclamation and Utilization

The proponents of the Reber Plan claim that the dams and fill would provide 20,000 acres of new land, and that, by creation of this land, shoal areas now present in the bay would be eliminated. This latter claim seems to be made without consideration of the suitability of this material as fill.

In testimony before the Board, the State Board of Harbor Commissioners and the Commissioners of the Port of Oakland, indicate that there are presently available large areas of land for water-front development and that no need exists for the lands which would be created by the Reber Plan. Large areas of the San Francisco waterfront are still undeveloped due to the adequacy of existing waterfront facilities or the unattractive financial returns to be obtained from developing new facilities. The Port of Oakland, in its planning, has projected over the years a major development of that Port designed to meet the needs for more modern and additional port facilities as they arise. It was stated that these facilities, coordinated with existing facilities and services already available, could be constructed at substantial savings in cost over those contemplated in the Reber Plan. It was further stated by the Port of Oakland authorities that large areas of highly successful, modern, efficient, and war-tested facilities would be scrapped by the Reber Plan.

The Reber Plan contemplated a water level in the fresh-water lakes of 9.0 feet above mean lower low water. During the public hearings, a great deal of apprehension over this feature was voiced by the representatives of the land owners in the Delta of the Sacramento and San Joaquin rivers. The Delta region comprises some 500,000 acres of valuable and highly productive farm land. The maintenance of the water level of the Reber Plan would inundate substantial portions of this valuable land due to the physical impossibility of providing adequate levee systems on the peat foundations so prevalent throughout this Delta region. Such a water level would not only cause inundation and require extensive levees in the Delta area, but in other areas as well. Throughout the Bay area, extensive modifications, alterations and replacements of all existing sewage and drainage systems would be required along the shores of both proposed lakes. The consulting engineer for Alameda County estimated that funds in the amount of $240,000,000 would be required for flood-control measures in the cities of that county alone. The State Engineer estimated that, for a water level of 3 feet above mean sea level, which is 2 feet below the level of the Reber Plan, $100,000 annually would be required for additional seepage pumping in the Delta region alone.

The County of Santa Clara, in its pres-

entation, indicated its present difficulties with floods in the lower regions of the county, and viewed with alarm any increase in water levels and the consequent more devastating effect of any floods on the valuable agricultural and industrial lands of that county. The City Engineer of Stockton concurred in the objections of the Delta region to the Reber Plan and noted the necessity for increased pumping of sewage and storm waters and pointed out that the large areas of the City of Stockton would be subject to inundation.

In one area of the Bay region alone, namely, Santa Clara County, the increased expense of waste treatment would be very high, and, were industry forced to meet this burden, it would either shift the bases of its operation or have to pass on the increased costs to the consuming public.

The Board concludes that the Reber Plan would greatly increase the complexity and cost of the sewage and waste-disposal problems throughout the areas bordering on the proposed lakes.

Industries

The adoption of the Reber Plan would have a very widespread effect on existing industries and the existing industrial pattern in the Bay region.

The southern shores of San Francisco Bay have been the scene of a major industrial development based upon the solar evaporation of salt water. The resultant salt and allied industries represent an investment of approximately $20,000,000. These industries would be eliminated entirely if the lower arm of the Bay were made into a fresh or brackish water lake. At the public hearings, a great deal of adverse testimony on the Reber Plan was introduced by the various salt companies through their consultants. The protest by one salt company expressed the opinion that the elimination of this salt industry would also have a dampening effect on the industrial development of the entire west coast.

In addition to the destruction of this major industry, as indicated above, the Reber Plan would have a definitely adverse effect upon the operations of the refineries in the Richmond area. The construction of one element of the Reber Plan would cut in half the existing refinery of the Standard Oil Company of California and the north dam would retard the distribution of its petroleum products by denying ready shipping access to the company's existing facilities. A similar statement objecting to the Reber Plan was entered by the Tidewater Associated Oil Company.

Fisheries

The Federal and State agencies concerned with the safeguarding of the fishing industry viewed the far-reaching effects of the Reber Plan on the fisheries in the San Francisco Bay area with alarm at the public hearings. They stated that the salmon run would be reduced materially, if not entirely destroyed. It was estimated that the construction of the Reber Plan would result in a loss of $16,000,000 annually to fisheries alone.

Economic Feasibility

Estimates of the cost of the Reber Plan, including the resultant damages, vary over a wide range. A rough, independent study of the major factors by the Board indicate that the direct cost of the plan would be at least $115,000,000, including damages to contiguous property, amounting to approximately $50,000,000. The opinion of the Alameda County Committee was that the cost would be as high as $1,500,000,000.

In addition to the direct cost of the project, consideration must be given to the indirect costs, some of which are tangible and capable of monetary assessment and others of which are intangible, but, nevertheless, of great importance.

Appendix No. 17 assesses a cost of $1,000,000,000 to these inherent damages. A partial list of the items included are as follows.

(a) Delays to navigation.
(b) Added cost of dredging San Francisco Harbor and entrances.
(c) Destruction of existing ports and port facilities.
(d) Loss of valuable water resources.
(e) Inundation of delta lands and other low-lying areas.
(f) Increased protection costs for non-inundated levee-protected lands.
(g) Increased pumping cost of drainage and sewage systems in low lying areas.
(h) Increased cost of proper sewage and waste treatment in bay communities.
(i) Destruction and dislocation of industry.

National Defense

The Reber Plan sets aside extensive areas for military and naval installations. However, no indication was given of the magnitude in dollar value of the military installations which would be eliminated or made ineffectual by the adoption of the plan. Substantial portions of the national wealth have been invested in the facilities of the shipyards at Mare Island and Hunters Point. These facilities have proved their adequacy in support of the late Pacific War. If the Reber Plan were adopted, it would jeopardize the mobility of any of the fleet units at either of these shipyards.

In their reply to the Board's inquiry, military and naval commanders in this area indicated the opposition to the Reber Plan and some stated that the additional military facilities proposed as one of the advantages of the plan are neither necessary nor desirable.

Damage to the locks or dams by enemy action or sabotage would render impotent ships and shore facilities within the lake areas. No responsible naval commander could afford to sacrifice the mobility of his command by basing it behind dams and subjecting it to the transit of narrow channels and locks in the event of a required sortie.

General Conclusion of the Board with Respect to the Reber Plan. Overwhelming opposition to the plan by State, County and City authorities, together with commercial and military interests, was presented at the public hearings. After careful consideration of this and all other factors involved, *the Board has reached the conclusion that the Reber Plan would result in the dislocation of industry, is economically infeasible and is untenable from the standpoint of navigation and national defense.*

BOOK REVIEW

THE FRACTURE OF METALS by M. Gansamer, E. Saibel, J. T. Ransom and R. E. Lowrie, published by the American Welding Society; 58 pages; Price $1.00.

In publishing this report to the Bureau of Ships of the U. S. Navy, the American Welding Society has provided means for engineers and designers to intelligently approach the problem of fracture. The report simultaneously is a summary of reviews of the literature and direct interviews with outstanding men in the field. As such it represents a compilation of the present knowledge of the laws and the fundamental mechanism of fracture in one booklet for ready reference.

The booklet is divided into two parts. Part I includes the original survey of the literature and an analysis of the theories of fracture and applications of principles, while Part II serves as a supplement in that it uses the framework established in Part I to clarify new developments in the theories of fracture and plastic flow. In addition to the extensive bibliography of approximately 300 references, a recommended research program is outlined.

This booklet and THE PROBLEM OF FRACTURE by John Hollomon, which was published about a year ago by the American Welding Society, make it possible to visualize if and how many of the confusing theories are related to each other.

New Ship Structure Materials

(Continued from March issue)

By DAVID MacINTYRE
Head Marine Section, Development Division
Aluminum Company of America

ALUMINUM

The commercial history of aluminum started in 1886 with the discovery of the electrolytic process for separating aluminum from its ores, made almost simultaneously by Hall in the United States and Heroult in France. Two years later, the Pittsburgh Reduction Company, later to become Aluminum Company of America, was founded to develop the Hall process. While aluminum is the most plentiful metallic element in the earth's crust, it is never found as free metal. The metallurgist makes it available from its native ores by refinement and electrochemical processes. Aluminum thus had to await the advancement of science and modern technological developments to make the metal available for use.

It was not long, during the early days of commercial development, that aluminum, because of its lightness, was adopted for the building of small boats. In 1891, France used the metal for yacht construction. Two years later, a torpedo boat with an aluminum alloy hull was built for the French Navy. This 60-foot vessel, using a 6% copper aluminum wrought alloy, was specified not to exceed 11 tons light displacement and to have a speed of 18¾ knots on a full speed trial of two hours with a 3 ton load. Her engines were triple expansion with a water tube boiler and indicated 275 to 300 H.P. on trial. Actually, her trial speed averaged 20½ knots on a displacement 1 ton below contract! Building of this vessel revealed the alertness of naval authorities to the possibilities of the light metal for increased speed, armor and armament of warships. Though this torpedo boat was a real credit to naval architects and builders, the choice of alloy indicated that the metallurgy of aluminum alloys was still in its infancy, many of its characteristics unknown and some misunderstood.

A good view of a lot of aluminum; also showing the swimming pool with a rope net made by Columbian Rope Co.

Technical research in the early days of commercial aluminum was virtually unknown. Cut and dry methods were generally resorted to with aluminum as with other metals. Technical control was limited solely to the chemical laboratory for checking quality. Mechanical testing was performed by outside proving agencies. Aluminum was used only where it could be afforded in marine applications.

An outstanding early example where the metal's lightness was utilized to improve stability and sailing qualities, was in the Herreshoff designed yacht "Defender," built secretly as America's contender for the International Cup Races in 1895. Her aluminum alloy plates and shapes were rolled in a steel mill and cast aluminum fittings were used above the waterline. Prior to this time, only a few aluminum boats had been built in the United States, principally for Arctic exploration. Launching of the "Defender" provoked a series of sensational stories, describing the failure of her aluminum structure. Government authorities condemned the metal and her builders and other experts were involved in endless controversy. While actual structural

failure had not occurred until long after the races were won, salt water and corrosion had finally overcome a construction using bronze rivets and aluminum plates. Such bad practices, coupled with adverse publicity and relatively high prices of aluminum (ingot was selling at 55 cents per pound and sheet at 82 cents and up), confined marine uses of the metal to a bare minimum for a few naval and other highly specialized applications. Not until thorough metallurgical studies had developed proper alloys, and tests had proved them could the marine engineer accept aluminum alloys.

Following the interest in the novelty and enormously increased availability of aluminum made comparatively cheaply by the Hall-Heroult process, aluminum and aluminum alloys continued to be used for the building of boats and yachts and for minor installations aboard larger of years. Numerous sporadic attempts were made to design and build speed boats and fresh water pleasure craft. Vessels such as the "Aquitania," built in 1914, and the aircraft carriers *Saratoga* and *Lexington,* completed just after the Washington Disarmament Conference, successfully used aluminum for electrical bus installations.

It was not, however, until 1912 that the metallurgist really opened the way to new uses formerly only dreamed of. In that year, it was discovered that certain wrought aluminum-copper-magnesium alloys were susceptible to heat treatment producing mechanical properties equivalent to mild steel. Original alloy of this type was trade-named Duralumin in Germany and became Alcoa 17S in the United States. Considerable research had to be done to establish the proper constituents and qualities of this alloy. For example, it was found that it did not possess the requisite high resistance to sea water corrosion, though all aluminum alloys are generally highly resistant. Aluminum Company of America, both before and after the establishment of its modern Aluminum Research Laboratories at New Kensington, Pa., discovered and developed many new alloys having specific properties for which uses were rapidly developed. In some cases, alloys were developed for specific uses. One of this type marketed in 1931, was a non-heat treatable aluminum-magnesium alloy, designated 52S, with a remarkably high resistance to sea water corrosion and good mechanical qualities in sheet and plate forms. About the same time Alcoa alloy 53S was also introduced for commercial purposes. Of the aluminum-magnesium-silicide type, this alloy was heat-treatable, almost equal to 52S in resistance to sea water corrosion, and had higher strength than 52S. It was produced in sheet, plate and both rolled and extruded shapes, and was also used for rivets of excellent characteristics.

The Washington Disarmament Conference in 1922 imposed restrictions on the displacement of warships. In effect, it again forced the attention of naval authorities to aluminum for aid in gaining the advantages of light weight. With the introduction of alloys having good resistance to sea water corrosion and high strength, structural possibilities of aluminum became apparent and attractive to authorities. Full advantage was subsequently taken of aluminum in the installations made aboard the German pocket battleships.

It is interseting to note that it was again military necessity which reintroduced large scale aluminum ship construction, 30 years after its first marine debut. Lightness of the metal aroused the interest of American naval engineers, since the core of the naval limitations of arms was the fixed limit of displacement. Earliest substitutions made were largely for furniture and for this purpose builders used Alcoa 3S, a non heat treatable maganese-aluminum alloy of excellent corrosion resistance but comparatively low strength. With aluminum only one-third the weight of steel and the total weight of furniture aboard a battleship exceeding 100 tons, considerable tonnage savings were effected when aluminum furniture was eventually adopted as standard. This apparently minor application proved the worth of the metal so that by 1933, when the new U. S. Naval building program was begun to offset threats of war in Europe and the Orient, the Navy and Alcoa were fully prepared to develop the latest strong aluminum alloys for structural applications aboard new warships. Catapults for aircraft carried aboard battleships and heavy cruisers, and elevators on aircraft carriers soon led to the use of these alloys for bridges, deckhouses, masts and yards on destroyers and cruisers and for the palisades of aircraft carriers.

With experience gained in the performance of light alloys and the intensification of naval building as a part of the guarantee against threats of war abroad, aluminum was designed into later vessels having regard, in addition to gains in speed and armament, to the improvement of stability and the advantage of the non-magnetic quality of aluminum located near compasses. By 1940, extensive use of aluminum by the Navy for topside structures had expanded to almost 100 modern warships and certain Alcoa alloys had been standardized for the work. At this time, an aluminum hulled U. S. Navy destroyer had been designed, and, but for the imminent danger of involvement of this country in World War II and the almost complete transfer of the aluminum industry to supplying the suddenly expanded building of military aircraft, would probably have been built. Actually, the Navy found itself at the outbreak of war with many up-to-date vessels whose excellence was in some measure due to their use of aluminum alloys. Many of them served wirh distinction. Some saw their finish in glorious action while others today are ending their careers at the ship breakers. With naval building currently in the pause to reconsider the strategy and logistics of naval warfare, of new weapons, and defenses against them, in the harnessing of new sources of energy for armament and propulsion, aluminum alloys are being given major consideration to again prove their worth in the Navy of the future.

In the early 1930's when the Navy began to utilize strong aluminum alloys in warship structures, forward looking minds in the aluminum and shipping industries were contemplating their possibilities for merchant vessels. Where naval vessels could afford to pay higher premiums for greater efficiency made

Ship Structure Materials

possible with these alloys, shipping operators had to ponder well the magnitude and economics of those applications for the several types of vessels considered. Lacking experience, naval architects and marine regulatory bodies were hesitant to introduce or approve aluminum alloys, such as Alcoa 52S and 53S, without adequate test data to substantiate them.

Unlike other industrial arts, progress in shipbuilding has always been properly restrained by established practice, but has regrettably often been retarded by an undue respect for it. This is understandable, since merchant vessels, their complements and cargoes are not considered expendable, but must be safeguarded through conservative design, construction and inspection to avoid disastrous results in operation in the form of costly repairs or alterations, loss of life, ship or earning power. Those agencies responsible for the preservation of high standards of strength and safety in merchant ships, are unlikely to risk their reputations without complete assurance that new ship structure materials will equal standards established with long accepted materials.

On the other hand, failure to recognize new materials in the construction of ocean-going merchant ships, could prove as disastrous as inadequate manning or lack of naval protection. The internationally competitive character of the business of water transportation can easily lead to previous adoption of new materials and techniques by competitors, with all the advantages occurring to them from such enterprise.

Fortunately leadership exists and even before the introduction and enactment of the Merchant Marine Act of 1936 to foster American foreign shipping, practical experimental tests were started by Aluminum Company of America to provide essential data necessary for development and approval of their recommended alloys. Several merchant ships had aluminum structural installations made. A large size section of a Coast Guard cutter was built, using standard shipyard equipment and practices, and moored in the historic salt waters of Hampton Roads in 1935 to prove the high corrosion resistance of marine alloys 52S and 53S. This vessel, the "Alumette," after 12 years of simulated sea service, has completely justified the claims of her sponsors. Corrosion of the vessel, even on the unpainted areas of the underwater hull, is negligible and her structural integrity is unimpaired. Bare steel, with its progressive type of corrosion, would long since have been eaten away through sponging and flaking and the vessel holed and sunk. The self-stopping type of corrosion in sea water peculiar to aluminum completely arrested itself after slight pitting within two years. It is anticipated on conclusion of these tests after a life of 20 years that the "Alumette" will not exhibit any appreciable further corrosion.

About the outbreak of World War II, a higher strength wrought alloy suitable for marine work was developed, perfected and introduced by Aluminum Company of America. Designated 61S, it is similar to the aluminum-magnesium-silicide alloy 53S, but also contains ¼% copper. It behaves much like its predecessor under corrosive conditions although 53S is slightly superior to 61S in salt water or marine atmospheres. Alcoa 61S, however, has much higher strength in all forms and tempers than 53S and has slightly better workability. With a guaranteed minimum yield strength of 35,000 pounds per square inch in its fully heat treated temper, 61S-T6 is stronger than mild steel. Because of the volume of aluminum alloys required for aircraft construction during the war, 61S was not used in marine work except for emergency military purposes. Its war service was so convincing as to all-round superiority for marine purposes, that it was quickly adopted for a number of post-war merchant ship structural installations. Today, it is accepted as standard in this country for hulls, superstructures and much equipment.

The first major aluminum alloy structural installation made in a merchant ship was carried out in Denmark in 1939 using materials furnished from Norway. This installation, made in the M. V. "Fernplant," utilized about 14 tons of aluminum alloys in the superstructure, including bridges, replacing 40 tons of steel. The aluminum-magnesium alloy used was similar to Alcoa 52S. "Fernplant" escaped the Nazi invasion of Norway and Denmark and saw considerable service throughout the world under wartime conditions. Her almuinum installation has given such satisfaction to the owners that they are having similar installations made in three sister ships building in Italy to Norske Veritas Rules and propose to use 61S-T6 alloy.

This is a change from past shipbuilding practice in Europe, where non-heat treatable wrought aluminum-magnesium alloys for ship construction have been used because of their high resistance to sea water corrosion and good strength. The British Admiralty specifies a magnesium content as high as 7% for such wrought alloys. It is doubtful, however, if those alloys with a 5% magnesium content or above have a wide range of application in view of their susceptibility to stress corrosion after exposure to comparatively low heat. The Admiralty also permits .15% copper content in aluminum-magnesium alloys, though they express a specificatinn desirability for none.

Since World War II, several important merchant ship structural installations have been made and additional ones are currently being planned and carried out in the United States and Canada. All of these installations are of riveted construction and utilize 61S-T6 for plating and framing with 53S alloy rivets. The U. S. vessels are designed according to American Bureau of Shipping requirements and the Canadian vessels to Lloyd's approval.

Three combination vessels, "Del Norte," "Del Sud," and "Del Mar," built in 1945-6 by the Ingalls Shipbuilding Company, Pascagoula, Mississippi, for the Mississippi Shipping Company are equipped with streamlined stackhouses. Each involves the use of 11 tons of aluminum alloy in its superstructure. These vessels, frequently referred to as the "first of the light tops," have been in regular service between New Orleans and the East Coast of South America since early in 1947. Their aluminum installations are

(Please turn to page 98)

Modern Oil Tanker Design

By FRANK E. PAVLIK

Sun Shipbuilding and Dry Dock Co., Chester, Pa.

Three systems of hull framing are presently employed in tanker design, viz: longitudinal, transverse and a combination system using longitudinals on the bottom shell and deck with transverse framing for the wing tank portions.

The longitudinal system is most commonly used in this country. Continuity of longitudinal at the oil-tight bulkheads is usually maintained by through brackets. The span of the longitudinals is limited by practical considerations to a maximum of 12′ 0″ by equidistantly spaced deep transverse web frames. The webs are trussed in the wing tanks, and are two or three in number, depending upon the length of the tank. At the ends of the vessel a gradual transition should be made from longitudinal to transverse framing, where the latter system is generally used because of much ship form. An overlapping or scraping of the framing should be incorporated in the structural design. The spacing of transverse bulkheads has gradually increased, so that cargo tanks are now about 40′ 0″ long. This is approved by the classification societies providing the structure is so designed as to withstand the dynamic stresses set up by the surging fluids in the tanks

The design of transverse and longitudinal bulkheads in the cargo space employs either corrugated plates or the plate and stiffener type of construction. The corrugated construction, some forms of which are patented, results in a bulkhead of lighter weight for equivalent strength.

Because of the corrosion factor the thickness of the upper strakes of bulkhead plating should be increased above strength requirements, in accordance with classification society recommendations.

The majority of modern tankers have two longitudinal bulkheads in way of the cargo oil space, dividing the hull transversely into a center tank portion flanked by wing tanks. This arrangement enables a more efficient distribution to be made of the material entering into the hull girder, simplifies piping arrangements, and facilitates loading and ballasting the ship. The longitudinal bulkheads are usually spaced a distance apart equal to about one half the beam of the ship.

Coffer-dams located at both ends of the cargo oil space are required by the classification societies. They should not be less than 3′ 6″ long in order to provide practical working clearances.

There are arguments pro and con for the location of cargo pumproom amidships or aft. The amidship pumproom serves as a coffer-dam, between the forward and after sets of tanks and facilitates the transportation of two grades of oil in one shipment. The center of gravity of the cargo is located further aft with this arrangement, therefore the center of buoyancy must move aft, resulting in a more favorable distribution of displacement The longitudinal bending moment in the hull is reduced in the sagging condition with the pump room amidships.

The location of the pump room aft eliminates the need, at least in part, for the after coffer-dam with the consequent gain in cargo cubic and saving in weight of one bulkhead. The pump room can be reduced in size because the prime movers for the cargo pumps can be located in the engine room, the shafts being fitted with stuffing boxes in way of the bulkhead. As a result of trim, cargo drainage to pumps by gravity may also be cited as an advantage, together with shortened lengths of steam piping to pumps.

Accommodations

The hull structure in way of the ends of deck erections, including shell, upper deck and fashion plates, requires additional strengthening because of high localized stresses in both hog and sag conditions, and the welding requires extra attention.

Excessive streamlining of deck house structures is uncalled for. A pleasing appearance combined with appropriateness of purpose can be attained without going to extremes. The "Chinese Wall" effect at bridge and poop fronts can be eliminated by slightly curving them in plan, and by logically stepping back the houses at each level. The bridge erection should be arranged to straddle two sets of cargo tanks so that cargo hatches will be clear of the enclosure. Because of reduced freeboards, the elevated fore and aft walkway between erections is a rule requirement.

The use of light weight alloys has not been presently applied to tanker deck house construction. Although there is a saving in weight amounting to about 28 per cent, the cost is more than doubled. The weight of house structure that might be adaptable to this construction would be approximately 120 tons on a 500 ft. Ship.

The tanker is at sea about 300 days per year; accordingly the standard for living accommodations should be above average in order to reduce the turnover of personnel. Typical gross special allowances for licensed personnel are about 90 sq. ft. per man; for crew members about 55 sq. ft. Many owners favor individual staterooms and bath for officers, and one or two person staterooms

for crew members. There is an increasing tendency to provide recreation rooms for officers and crew. Bulkheads in way of accommodations are of light steel or metal clad asbestos board construction; fitted with hollow metal doors. The furniture is usually of metal construction. The trend in heating and ventilation for accommodations on tankers is to install warm air systems, utilizing the ventilation air for the heating medium, and providing about a five minute air change.

Pump room ventilation is an essential requirement, and commonly consists of a liberal natural supply combined with a mechanical exhaust system. The exhaust duct take-offs are located about 18 inches above the bilges and maintain an average air change of about five minutes. Fan motors must be spark-proof and must not be located in the pump room or air stream. Fan impellers should be made of brass or aluminum.

Hull Fittings

The mooring fittings, scuppers, deck fittings, etc. are usually weldments or steel castings and should be of simple and rugged design. Rail stanchions should have an ample cross section to withstand bending due to nominal shock and heavy seas, and valve stems projecting above the weather deck should be protected by suitable deck stands. Where there is any danger of creating a spark in the presence of explosive vapors by steel striking on steel, one of the parts involved should be made of a brass composition.

Hatch openings in the upper deck should be cut in the lighter strakes of plating, and the center tank hatches should be staggered with respect to the pairs of wing tank hatches so that in the transverse plane a minimum of area is removed from the deck section. The hatches have circular steel coamings, welded, 3′ or 4′ diameter, 30″ high; fitted with hinged flat steel covers or dished heads made oil tight at the joint by heavy flax or neoprene gaskets retained in a steel channel. The covers are made fast by several dogged bolts or by a strongback locking bar spanning the diameter, and are fitted with

VAPOR CONTROL system of an oil tanker is shown in drawing. The vapors which rise from the partially-filled cargo tanks emerge from a vent at masthead where they can be dissipated into the air.

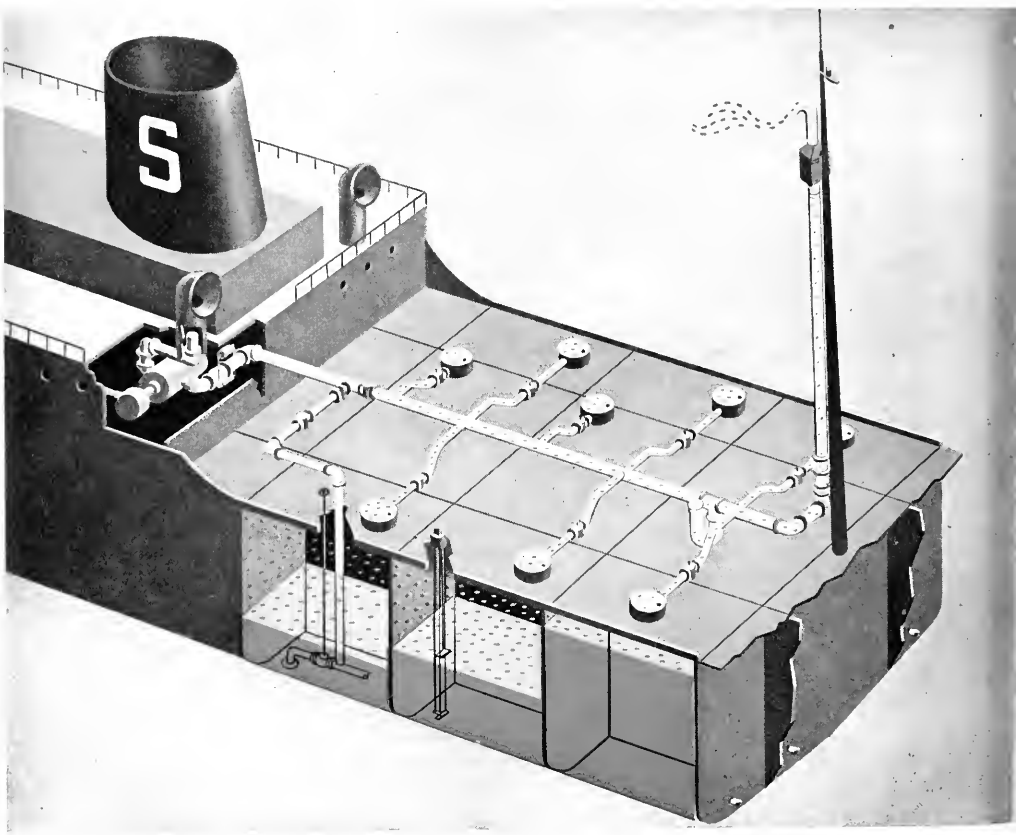


Illustration courtesy of *Standard Oil Magazine*

ullage covers with spark screens. The covers are raised mechanically by a lever arm, pivoting about the hinge pins as a fulcrum and actuated by a screw and nut device. Some of the companies have used cast aluminum alloy hatch covers that can be handled manually. An idea that has been propounded, and has merit, is the fitting of a second and somewhat smaller hatch in each cargo tank for the purpose of providing cross ventilation.

In each tank, coffer-dam, etc. a bleeder plug, preferably of stainless steel, should be fitted so that the compartment can be drained when the vessel is in dry dock. The use of brass plugs in tankers engaged in the gasoline trade is not recommended because the threads become corrosively worn away.

The cargo loading and discharging nozzles are usually amidships and suitable derricks should be adjacently located for handling the oil hose. Two 2 ton booms should be stepped on each kingpost so that the hose may be suspended in a bridle arrangement over the side. The running rigging should consist of manila rope and wooden blocks to eliminate the spark hazard.

Propulsion Machinery

The selection of the power plant for a tanker design is predicated upon several factors, viz: owners preference, reliability and simplicity, cost and ease of repairs and maintenance, economy of operation, weight and space requirements and capital investment. Each factor must be considered and its importance analyzed from the standpoint of making the vessel an economical carrier for the entire period of its life expectancy. In the last analysis the effect of all combined factors in reducing the cost of transporting the cargo in cents per barrel governs the choice.

A brief analysis of these factors seems in order. Owner's preference may be based upon a satisfactory experience with a certain type of prime mover and that he desires to maintain similar units in his fleet for transfer of parts and personnel. Reliability and simplicity are considered as they affect design, materials and construction, assurance of maintaining schedules and absence of mechanical failures at sea. The tanker, because of its short turn-around period, has no time for extensive repairs and maintenance. Economy of operation presently stresses fuel economy as the major factor, but lube oils, etc. must be considered. The weight element is reflected in a loss or gain of deadweight, and similarly space requirements affect cubic available for cargo. An expensive machinery installation may be the cheapest, providing that a low fuel economy is realized and that low repair and maintenance costs are effected.

Types of tanker power plants presently installed include: geared steam turbines, turbo-electric, direct Diesel, geared Diesel and Diesel electric. The first three embrace the great majority of tanker installations. Gas turbine installations, although promising in regard to fuel and weight economics are still in the experimental stage of development, and nuclear power is the germ of an idea for the future. The trend in the U. S. A. has been to favor the steam propulsion plant installations, whereas in Europe the internal combustion engines have taken the lead. In the U. S. A. the majority of shipyards purchase the propulsion machinery from a sub-conttactor and install it in the vessel. From the angle of installation costs there is little to favor either the steam or the Diesel job. As regards operation and maintenance there is a relative parity between the turbine plant and Diesel plant.

The cross compound turbine plant, using double reduction gears, has the advantages of light weight combined with flexibility of arrangement and low spacial requirements. It has steam in abundance for pumping cargo, steaming out tanks etc. The present practice favors steam conditions at 450 psi., 750° F. total temperature, but the trend is definitely upward. The main steam piping installations have usually been of carbon steel for the above steam conditions; for steam at temperatures of 750° F. to 900° F. carbon-moly pipe has been used, and above this the practice seems to indicate chrome-moly pipe as required. In a comparison of weights with a Diesel installation, the feed water and greater amount of fuel required must be taken into account.

The turbo-electric installation was brought to the fore by the manufacturing exigencies created by World War II. It is a reliable power plant, possesses great flexibility for maneuvering and can easily meet large steam and electric port requirements. The source of power is alternating current supplied at 2400 volts to the propulsion motor, 440 volts to auxiliary motors and 115 volts for lighting. As compared with the geared turbine job there are slight increases in fuel consumption, plant weight and cost.

The direct Diesel installation has a higher plant weight due to two factors, viz: increased weight of propulsion machinery and weight of boilers required for cargo use. This is more than offset by the weight savings effected by greater fuel economy, reduced water requirements and the ability to carry a greater cargo deadweight. With only normal care the maintenance costs are comparable. The present trend toward higher propeller speeds reflects an advantage to the Diesel plant because lighter and smaller engines can be used to develop the same power.

The present maximum power requirements for modern tankers are under 15,000 S. H. P. The power plant is usually designed as a single screw installation as this arrangement combines advantages of minimum plant weight and special requirements together with highest propulsive efficiency. Auxiliaries driven by electric motors generally use direct current, 230 volts, but there are some A. C. installations. The lighting circuits usually operate at 115 volts.

Table IV has been prepared on a percentage basis for comparison of a geared turbine plant (450 psi.—750° F.) and a direct Diesel plant for a 500 ft. tanker, developing 6000 S.H.P. at about 95 R.P.M., cruising radius of 10,000 nautical miles. The relative fuel economies for all purposes have been assumed as follows:

Geared turbine plant — 0.59 lbs./SHP hr.
Direct Diesel plant — 0.38 lbs./SHP hr.

TABLE VI

	Geared Turbine	*Direct Diesel*
Hull & Outfit	20.1%	20.1%
Propulsion Machinery	3.0%	4.6%
Fuel	4.9%	3.2%
Fresh Water, Stores, Crew	1.4%	0.6%
Cargo	70.6%	71.5%

(Please turn to page 75)

Ray Sample

--With The

Above, three tables at March meeting of Port Engineers Society of San Francisco. Center picture shows, left to right: Ray Sample, Matson; I. B. Chapman, American President Lines; President Phil Thearle, USAT; Speaker Harry Gamlen; N E. Walterspiel, Windsor Fuel Co.; and Ed Graff, Grace Lines. Mr. Gamlen's talk on boiler treatment is published in part on Page 61.

Port Engineer of The Month

SAN FRANCISCO

RAY SAMPLE
OF MATSON NAVIGATION COMPANY

A veteran on the seas, Ray Sample has sailed on the freighters *Manukai, Makena, Maunalei, Maliko, Maunawili, Mikiki, Mala, Maui,* and *Golden Kauri,* and on the passenger vessels, *Mariposa, Monterey, Matsonia,* and *Lurline.*

Born in Brockton, Massachusetts, Ray began his career after graduation from the Massachusetts Nautical School in 1918. He sailed for six years in a licensed capacity in the engine departments of various steamship companies on the East Coast and then joined Matson in December, 1925 as Fourth Assistant Engineer on the *Manukai.*

After serving as Chief Engineer during the war (1940-44), Ray came ashore in March, 1944 as Assistant Port Engineer. Upon the retirement of Henry Wolters in February, 1946, Ray became Port Engineer for Matson.

Ray is a member of the Board of Governors of the San Francisco Society of Port Engineers.

Port Engineers-

On page 60 of this issue appears a roster of members and officers of the Society of Port Engineers, Los Angeles.

A roster of members and officers of the San Francisco Society appeared in the March issue of the *Pacific Marine Review.*

The type of highly informative programs being offered at meetings of the Port Engineers Societies is suggested by the following schedule of the San Francisco Society:

APRIL—*Soot Blowers*

MAY—*CO_2 and Radar*

JUNE—*Combustion Control Boards*

JULY—*Steam and Electric Drives*

AUGUST—*Application of Bottom Paint*

Roy Campbell

Port Engineer of the Month

LOS ANGELES - LONG BEACH HARBOR

ROY CAMPBELL
OF CAMPBELL-JACKSON

The sea has always held a fascination for Roy, who has really been around. A native of Australia, he left there in 1916. At the youthful age of 15 he went to sea on the *SS Cripple Creek* and *West Jappa* for Frank Waterhouse and Company. The Hawaiian Islands lured him in 1920 where he served his apprenticeship in the machine shops of the Catton and Neil Iron Works.

Off to sea again in 1921, he sailed on the *West Nilus* for Matson.

On Richfield ships from 1927 to 1936, Roy served in all capacities up to chief engineer. He was second assistant on the *SS Tamihua* when she went aground at Pidgeon Point in 1931.

Roy served as assistant engineer for General Petroleum in 1938 and was with Consolidated Steel in 1941 as first marine machinist and later as trial chief engineer. As owner's representative, he went on the maiden voyage of Consolidated's first C-1, the *Agwimonte.* In 1941 he went on the third C-1, *Alcoa Pennant,* to Honolulu, arriving at Pearl Harbor December 30 of that year.

Roy worked under Harry Summers for one year at the American Bureau of Shipping and under Paul V. Gaudin for three years as assistant superintending engineer for American Pacific (formerly Los Angeles Tankers).

He is now an engineer wih Campbell-Jackson Marine Surveyors.

MEMBERSHIP ROSTER
SOCIETY OF PORT ENGINEERS
LOS ANGELES

Wm. Anderson	Keystone Shipping	1015 Chestnut St., Philadelphia, Pa.
John R. Black	Amer. Bureau of Shipping	106 East "F" St., Wilmington, Calif.
S. F. Boomer	Lloyds Register of Shipping	2460 Cedar Ave., Long Beach
R. R. Campbell		222 W. 20th St., Long Beach
Fred Cordes	Deconhil Shipping Co.	305 No. Avalon, Wilmington
Geo. W. Curran	Amer. Pacific SS Co.	365 W. 7th St., San Pedro
R. H. Cyrus	Union Oil	Drawer 846, Wilmington
Joe Dennis	Craig Shipbuilding	Long Beach
Dave DeRochie	Pacific Marine Review	816 W. 5th St., L. A.
Dan Dobler	Texas Co.	P. O. Box 755, Wilmington
H. Dreggors	Amer. Pacific SS Co.	365 N. 7th St., San Pedro
C. T. Duggan	Amer. Pacific SS Co.	365 N. 7th St., San Pedro
H. M. Gaither	Isthmian SS Co.	Pier A, Long Beach
Paul V. Gaudin	Amer. Pacific SS Co.	365 W. 7th St., San Pedro
Glen Gulvin	Amer. Pacific SS Co.	365 W. 7th St., San Pedro
Bert L. Hale	Marine Solvents Corp.	216 - 2nd St., Seal Beach
J. T. Hare	U. S. Maritime Commission	111 W. 7th St., San Pedro
Ed. L. Harris	Uhlin Machine Works	1435 So. Beacon St., San Pedro
Geo. Hoxie	Amer. President Lines	Berth 155, Wilmington
C. L. Jackson	Jackson-Campbell	2539 E. 3rd St., Long Beach
M. H. Kelly	Richfield Oil Co.	1400 W. 7th St., Long Beach
Lloyd L. Kennedy		2009 Averill St., San Pedro
Ed Lawlor	Amer. Pacific Lines	365 W. 7th St., San Pedro
Ed Markey	Union Oil Co.	Drawer 846, Wilmington
H. W. McEwing		2174 Magnolia Ave., Long Beach
Geo. H. McCoy	Marine Solvents	2427 Pine Ave., Long Beach
Harry Miller		1253 Sunside Co., San Pedro
H. Neergaard	Burns Steamship Co.	Box 247, Wilmington
C. W. Peterson	The Texas Co.	24413 Deepwater, Wilmington
Carl Reed	Richfield Oil Co.	1400 W. 7th St., Long Beach
Tom Rhodes	The Log	124 W. 24th St., Los Angeles
Lloyd Richardson		305 N. Avalon Wilmington
G. A. Robinson	L. B. Marine Repair	1409 W. 7th St., Long Beach
Wm. Scott	Catalina Island SS Co.	Box 847, Wilmington
C. T. Solomon		106 E. "F" St., Wilmington
C. P. Snively	Amer. Pacific SS Co.	2181 Chestnut Ave., Long Beach
Harry J. Summers	Amer. Bureau of Shipping	1217 So. Leland, San Pedro
J. L. Wosser	Matson Navigation Co.	5530 Telbury, Long Beach
Banning P. Young		810 N. Fries Ave., Wilmington

1948 OFFICERS

JOE WOSSER, *President*

DAN DOBLER, *Vice President*

BURT HALE, *Secretary*

ALEX ROBINSON, *Vice Secretary*

How to Get the Most Out of Your Fuel Oil Dollars*

By H. GAMLEN

Harry Gamlin giving talk at Port Engineers' Society of San Francisco, March 3.

Nearly twenty years ago, I stood before a similar group of San Francisco Port Engineers, and announced two important discoveries pertaining to the fireside of steam boilers,—namely, that boiler metal, with particular reference to the radiant heat section, underwent a chemical change to become a sulphide of iron; and that deposits of combustion commonly called "soot" were not carbon compounds, but instead, compositions of silicon, aluminum, iron and calcium sulphates, sulphides and oxides.

Today these truths are even more evident, due to increasingly poorer grades of fuel, higher rates of combustion, more square footage of radiant tube surface, and closer spacing of tubes; and I should like to have you become acquainted with the analysis of an average sample of oil, and follow its journey through the supply tank, the heater, the burner, the chemistry of combustion, the formation of combustion deposits, their analysis, and finally control by chemical means.

A few years ago the National Association of Power Engineers conducted a survey and showed that approximately half of the heat value of fuel burned under boilers was wasted; most of it by way of the smoke stack. It is, of course, impossible to convert all of the heat value of fuel into useful energy, but we can go a long way toward obtaining higher combustion efficiencies in many plants.

For instance, an improperly instructed fireman may assume that he is doing a good job in maintaining smokeless combustion, but the fact remains that such practice may be costing up to 10% of the total fuel consumed.

High percentages of carbon dioxide in flue gases can also account for false economies, but in my experience, one of the chief losses results from inefficient or insufficient combustion caused by the high interfacial tension of the oil itself, due to small amounts of water.

Practically all crude oils produced contain salt water, either in a free state, or in the form of an emulsion. It is estimated that of the total of 2,200,000,000 barrels of crude oil, over 400,000,000 barrels recovered yearly is in a highly emulsified state.

The primary methods for breaking up emulsions are the addition of chemicals, by applications of electricity, heat and pressure, or a combination of these methods.

Difficulty with fuel oil actually starts at the well, where the crude is produced, for as previously mentioned, practically all crudes produced contain a certain amount of salt water.

In an emulsion, the internal phase is the emulsified element.

Figure I shows a typical example of a loose emulsion, which clearly describes the internal phase. Note that the droplets are of various sizes. Whenever the water is free, some of it will separate on standing. Of course, the gravity of the mass has considerable influence on this action. If the emulsion is unstable, and it is well to remember that it can be both stable and unstable, much of the water can separate out, leaving the stable emulsion still in suspension in the oil.

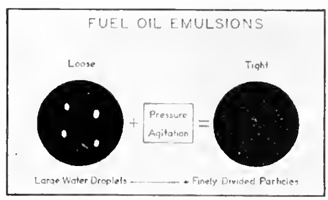


Fig. I

However, each time the oil passes through small openings, subjected to pressure, caused to surge through pump chambers, or wire-drawn, so to speak, through partially open valves, a condition or process is set up which tends to break the water droplets into finer particles, and create the condition known as a "tight" emulsion. It is this condition that helps to create the sludge with which we are all familiar.

This sludge and muck accumulate on tank bottoms and tank sides. The suction line of the fuel pump collects sludge and muck. Liver-like substances form in the fuel pump. Heavy collections of carbon compounds form in oil pre-heaters;

---

*Paper presented by H. Gamlen, President and Chief Engineer, Gamlen Chemical Company, before the Port Engineers' Association of San Francisco, California, March 3, 1948, at the Whitcomb Hotel.

FUEL OIL DOLLARS

strainers become clogged.

When burning this oil, carbon forms on the burner tips. Frequently there is excessive sparking, poor atomization, oil sprayed on side walls, and in many installations, heavy chunks of carbon form in the furnace, smoky flames, etc. Of course, some of these combustion troubles are undoubtedly due to equipment, and some to improper handling, or insufficient knowledge of proper practice.

Oil storage tank troubles are due primarily to the formation of sludge in the bottom of the tank. Sediment due to foreign substances, such as sand, is seldom serious. In cold climates where heating coils are installed, excess heating carbonizing and water leakage are also quite troublesome.

You will remember that practically all fuel oil contains a certain amount of water, in either stable (emulsified, tight) or unstable (loose) form. In addition, tank sweating and leaks after the oil has been received, plus ballast water, provides another direct source of water contamination.

Although it will surprise many, the analysis of sludge shows that it is a composition of emulsified oil and water, with the water content sometimes ranging up to 75% of the volume. Most sludge, as many engineers are aware, will not burn, nor is it dissolved by mineral spirits, kerosene, alkalis, or caustic compounds, etc.

The presence of sludge in a storage tank not only occupies valuable space, but constantly provides the opportunity for loose material to break away, and enter the suction line, causing trouble at a time when trouble is least desired.

Sludge and muck in suction lines between the tank and fuel pump can cause much trouble. It reduces the capacity of the pipe, and puts a greater load on the pump, increasing the necessary power and the cost to pump the required amount of oil. Remember, everything that moves, everything that turns, constituting a mechanical movement, costs money. Every B.T.U. saved is a B.T.U. earned.

Oil strainers, of course, are a necessity in any oil burning plant. Whether or not we can rightfully include this piece of equipment into our list of troubles, I am not sure, since its purpose is to prevent trouble by collecting foreign matter before the oil enters the burner itself, preventing a shutdown of the fire.

When carbon formations exist on the plate or tube surfaces of the oil preheater, the rate of heat transfer is reduced in proportion. Carbon formation in oil heaters is primarily due to excessive temperature, but the presence of water in oil plays an important part in causing deposits to form in oil preheaters. For instance, when conducting a flash test on a sample of oil free of water, the surfaces of the oil remains quite still, and the test is quickly completed. When conducting the same test on oil containing a small amount of water, the sample foams, making it difficult, if not impossible, to conduct the test. Pour a small amount of water free oil on a heated plate; it will either smoke, vaporize or burn, depending on the temperature, but if it contains water, it will sizzle or spit depending on the temperature of the test plate.

The Gamlen Chemical Company started work in 1935, and by 1939 had formed definite conclusions together with a practical chart for use by engineers. We called it the "Viscosity Temperature Chart," and, in 1942, we converted it into a direct reading scale in three columns as follows: Saybolt Seconds Universal Scale, Saybolt Seconds Furol Scale, and Fahrenheit or Temperature Scale.

The Saybolt Scales were used because most oils used in the United States are based on Saybolt standards. In 1942, we dressed up the chart in the form of a thermometer, as it is now so well known among engineers. (Fig. 2.)

In using this chart it is only necessary to know the Furol viscosity of the oil delivered and, going up the Furol column, find the Furol figure. The correct atomizing temperature for that oil is found in the Fahrenheit column directly to the right of the Furol column.

The faster the process of combustion, the more efficient the combustion. The flame should be clean, bright, but soft, and so designed as to almost completely fill the furnace. Keep in mind that approximately 50% of the work done by a boiler is done in the radiant heat of the flame. Accordingly, a short blasting type of flame, caused by excess preheat and pressure, is not conducive to efficient combustion and good radiation. In general, the faster the process of combustion, the more efficient the combustion. Ordinarily, a flame surrounded by incandescent refractory with its supporting and reflected heat, will be more complete and more efficient than when surrounded by water walls. The average temperature of a furnace surrounded by water walls is probably 2200° F. In a refractory lined furnace, much higher temperatures are obtained.

The combustion taking place in a common candle flame presents an excellent comparison to an oil flame. The wax or tallow is a form of solid hydrocarbon. When we light the wick, the solid wax is melted and, by capillary attraction, the liquid carbon and hydrogen compound flows toward the heat of the flame. A chemical process is started in which oxygen from the atmosphere is rushing at high speed to combine with the carbon and hydrogen. (Fig. 3.)

By observation, we note there are three distinct cones in the flame, brought about by the destructive distillation and oxidation, changing the liquid fat into gases. The first cone is blue and transparent, typical of burning pure hydrogen. The second cone, formed almost completely around and enclosing the blue cone, except at the bottom near the wick, is a bright yellow to almost white. Oxygen rushing in from the bottom and sides of the flame, cannot completely enter the envelope and is not sufficient for the complete combustion of the inner envelope.

The bright yellow cone is the carbon cone and, while water vapor is being formed at the inner cone, carbon dioxide is being released at the end of the carbon cone. However, due to the cool air surrounding the flame, there is a loss of temperature on the surfaces of the

VISCOSITY TEMPERATURE CHART

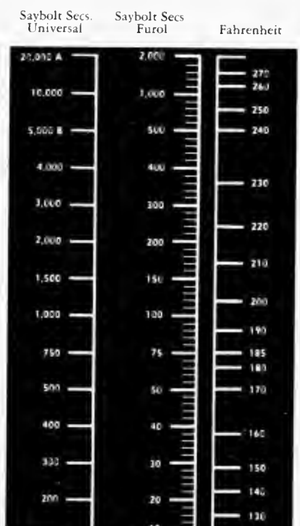


Fig. 2

◄ INSTRUCTIONS

A. Limit of pumping.

B. Limit of easy pumping.

To obtain best atomizing temperature of a fuel oil, determine Furol viscosity from delivery slip and select correct temperature in Fahrenheit column.

Operate with atomizer valve wide open and control b.t.u. release and load with oil pressure.

Adjust air supply just sufficient to obtain a smokeless fire, any excess above this results in a serious heat loss.

Average Bunker fuel contains 84-86% Carbon, 10-12% Hydrogen, 0.75-1.5% Sulphur, plus Oxygen, Nitrogen, Moisture and ash.

To find b.t.u. value, multiply percent of carbon content by 146, the percent of hydrogen by 620, the percent of sulphur by 40. Sum totals b.t.u. content. Approximate.

Each pound of carbon requires 11.6 lbs. of air for its combustion. Each pound of hydrogen requires 34.5 lbs. of air. A small excess is necessary above this exact requirement.

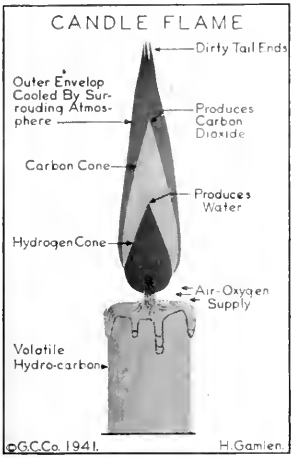


Fig. 3

outer envelope; and due to this loss of temperature, all of the carbon is not converted into carbon dioxide. Some of it is converted only to carbon monoxide. In fact, the dirty tail ends (smoke) at the end of the flame indicate that some carbon has not combined at all.

This candle flame is surrounded by all the oxygen in the world, but it does not use it. It only uses that which this amount of carbon and hydrogen can handle under this specific condition, and both elements are starved because of insufficient temperature. Combustion was incomplete and inefficient because the excess air surrounding the flame cooled the envelope and slowed down the speed of combustion.

I will now follow through the process of combustion, showing particularly the characteristics of sulphur during and following the process of combustion.

A Typical Analysis of a Good Quality Fuel Oil

Carbon	83.9%
Hydrogen	11.0%
Sulphur	1.5%
Oxygen	1.2%
Nitrogen	1.2%
Moisture	1.0%
Ash	0.2%

A Typical Analysis of an Average Sample of Fuel Oil

Carbon	83.2%
Hydrogen	10.2%
Sulphur	2.4%
Oxygen	0.6%
Nitrogen	0.5%
Moisture	1.4%
Ash	1.7%

You will note from this sample a characteristic change. As the hydrogen content decreased, all of the other elements increased in proportion. The B.T.U. value also decreased. It is highly important, therefore, when purchasing fuel oil to have a knowledge of the values of each element, which makes up the sum total of B.T.U. content.

In order to burn fuel, we must have oxygen which is obtained from the atmosphere. Air is a mixture consisting of 21% oxygen and 79% hydrogen and one pound equals 12.4 cubic feet.

Carbon is the principal element of all fuels. It ignites at from 1450° to 1650° F., and under proper conditions, burns to carbon dioxide. In passing, if there is a lack of temperature and/or a limited air supply, carbon monoxide is formed.

Each pound of carbon requires 2.66 lbs. of oxygen, obtained from 11.6 lbs., or 143.7 cubic feet of air, and burns to form 3.66 lbs. of carbon dioxide. Each pound of CO_2 produced releases 14,600 B.T.U.s of heat. 126 cubic feet of nitrogen contained in that quantity of air, is heated at the expense of the carbon, and passes to the atmosphere. The percentage of carbon content of fuel multiplied by 146 equals the B.T.U. value for that particular element.

Hydrogen ignites at 1190° to 1197° F. and, under proper conditions, burns to water or steam. Each pound of hydrogen requires 8 pounds of oxygen for its combustion, obtained from 427.3 cubic feet of air, and producing 9 pounds of water. Each pound of water so produced yields 62,000 B.T.U.s. The percentage of hydrogen present in the fuel, multiplied by 620, is the sum of the value from that particular element in the fuel. 338 cubic feet of nitrogen from the air passes to the atmosphere, taking no part in the process of combustion, except to control the release of oxygen.

In technical literature of combustion, authors seldom give sulphur more than passing mention. The usual remark is, quote "Sulphur is also present in fuels, but in such small amounts and of such low B.T.U. value, we need not consider it here," unquote. However, we will soon see just how important it is to the owner and operator of a steam boiler.

Instead of using one pound of sulphur, as we did with carbon and hydrogen, I will take 3.2 pounds for greater convenience. The combustion of sulphur requires equal amounts of oxygen. Therefore 3.2 pounds of sulphur requires 3.2 pounds of oxygen obtained from 23.04 pounds or 285.4 cubic feet of air. It ignites at 450° to 850° F., producing 3.4 pounds of hydrogen sulphide. In doing so, it obtained 0.2 pounds of hydrogen from the fuel.

Hydrogen sulphide is quite unstable and it quickly combines with oxygen to produce 6.4 pounds of sulphur dioxide and 1.8 pounds of water. Each pound of sulphur dioxide produced releases 4000 B.T.U.s. The per cent of sulphur in the fuel multiplied by 40 is the sum of the B.T.U.s released.

Combustion of One Ton of Fuel Oil
(Fig. 4)

Before continuing with the products and deposits of combustion, let us take a glance at a complete picture of the results of burning one ton of fuel oil of a given analysis. The right hand column shows the elements and percentage present in the fuel. The second column shows the weight of each element. The third column the amount of air required. The fourth column the amount of carbon dioxide produced. The fifth column the amount of water. The sixth the amount of sulphur. The seventh column the amount of sulphurous acid gas. Column eight shows the total of sulphuric acid produced from 1½ (one and a half) pounds of sulphur. Column nine, the free oxygen, and ten, the free nitrogen. Please note that no excess air was included. Also the amount of air for the sulphur was for burning to SO_2 only. Finally, add 79% of the air to column ten.

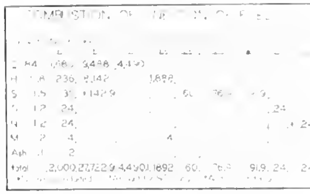


Fig. 4

In burning fuel oil or any fuel for that matter, it is not sufficient to bring about complete combustion of the fuel, but in order to obtain the most economical performance, we must have fast, complete combustion with an absolute minimum of excess air. Excess air is a costly error of operation. It enters the furnace at approximately 70° F., and leaves the stack, usually from 350° to 700° higher in temperature. Not only does this excess air carry heat units up the stack, but as in the example with the candle flame, has a tremendous cooling effect, and slows down the speed of combustion, resulting in lowered economy.

Returning again to emulsion in fuel oil, it is found that anything that interferes with the surface tension of the oil, also interferes with the atomization and vaporization of the fuel at the burner. It will be appreciated, therefore, that having provided for the deficiencies outlined under the example of the candle, it is highly important that maximum vaporization be obtained. If oil can be vaporized completely, but not to the state of becoming a gas, the better the possibility of thorough mixing with the air supply, and obtaining the maximum B.T.U. release from the fuel.

B.T.U. Value in Oil

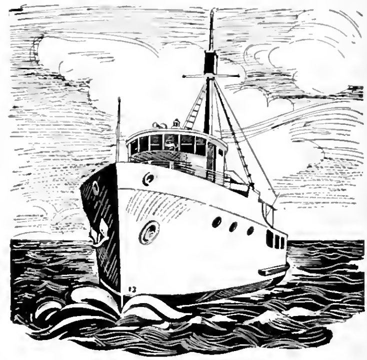
The average value of a good oil is between 18,000 and 19,000 B.T.U.s per pound. One 42-gallon barrel is equal to 315 pounds or 5,670,000 to 5,985,000 B.T.U.s per barrel.

The average B.T.U. release obtained on boiler installations is only 55%, or 9,000 to 10,000 B.T.U.s per pound of oil from a potential of 18,500 per pound. Because of certain unavoidable losses, it is impossible to get all of the value out of fuel, but we should get up to 85% of it.

Since the average value of a barrel of oil is 5,827,500 B.T.U.s, and the average value obtained is 55%, it is readily seen that it is possible to obtain an in-

(Please turn to page 73)

Coast Commercial Craft



FLYING FOR FISH

Eagle eyes of war trained combat men will soon be searching the seas for huge schools of tuna in the newest effort to catch more fish quickly. A new high in seagoing aircraft carriers was set at San Pedro recently when the 105 foot tuna clipper *Calistar*, built two years ago at Harbor Boat Works in Fish Harbor, Terminal Island, sailed out of port, bound for Mexican waters, with a four passenger Republic Seabee plane riding securely on her stern.

A special steel top built above the bait tank on the *Calistar* provides the base for a special cradle which carries the tuna clippers "observation plane." The *Calistar's* boom lifts the four place amphibian flying craft off its cradle and lowers it into the water, then picks it up again and puts it back atop the bait tank. There is still plenty of room for fishermen to operate beneath the strongly built cover, and even with the plane aboard it will not interfere with fishing activities, once the tuna start biting.

At least such is the opinion of Capt. Oren Dickason, ex-navy man of San Pedro, who with Fred Taylor, ex-army man of Long Beach, own the *Calistar*.

Pilot of the spotter plane will be Alvin Walters of San Pedro, who spent a lot of years flying for the ATC in Alaska, India, China, Burma and Europe, which included 1300 hours in flying over the hump in China. Official spotter for the cruise will be Earl Peterson of Long Beach, a veteran fisherman and another ex-serviceman.

Best spotting altitude, the flying fishermen declare, is from 500 to 700 feet. From that height they can spot schools of fish at deeper levels in the ocean, and tell what kind of fish they are. The plane has a crow's nest beat many ways because it extends the radius the ship can cover by hundreds of miles. The plane has a cruising radius of 680 miles and is equipped with two way radio so that it can talk with the mother ship constantly.

Captain Dickason said the plane would be used for spotting both schools of tuna and bait. Once the school of fish is spotted and the *Calistar* notified the plane will return to the ship, be hoisted aboard and Pilot Walters

New Moran Tug Puts To Sea

The Eugenia M. Moran

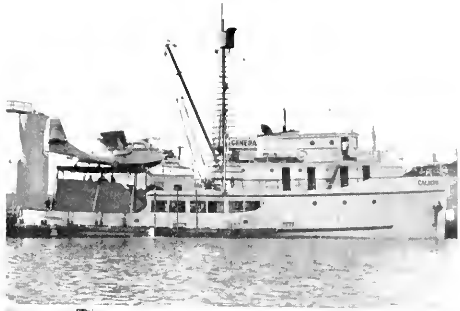
Latest addition to the Moran Towing & Transportation Company's sea-going fleet, the *Eugenia M. Moran*, 143-foot, 1900 horsepower, Diesel-electric, former Navy tug, heads for sea from New York harbor on her maiden tow under the "M" flag. The *SS Willis Vickery*, 523-foot, 10,684 gross tons, C4-S-A1 type vessel formerly operated by American President Lines in its Around the World Service, was towed from Pier One, North River, to the James River fleet anchorage in Virginia.

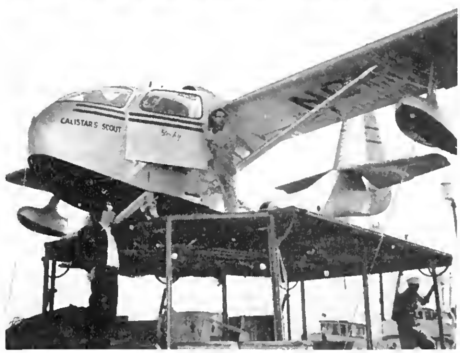
and Spotter Peterson will get ready to help with the fishing activities.

The *Calistar* brought in 115 tons of tuna on its last trip which took 50 days. Captain Dickason and his crew, mostly ex-servicemen, believe they can fill the 165-ton capacity holds of the *Calistar* to the overflowing in a much shorter time by using the spotter plane.

Planes have been used by several tuna clippers in the past but experiments have not been too successful. Captain Dickason and Pilot Walters have the thing all worked out on an economy and operational basis that they believe will prove successful. The cradle for the plane is sturdier and stronger than any ever used before and the plane can carry sufficient fuel to operate over areas successfully and keep constant radio contact with the ship.

Anyway, Captain Dickason and his twelve crew members hope to be back in Fish Harbor soon, with a full load of fish, thanks to the new spotter plane.





Top: Tuna clipper Calistar (105-feet) shown at General Petroleum Van Camp dock, Fish Harbor, just before sailing for Mexican waters, with the scout plane, Calistar Scout, a four place, Republic Seabee, on the stern.

Center: Pilot Alvin Walters is shown hosing off the Calistar Scout. The plane has a wingspread of 32 feet, but doesn't appear out of proportion on the stern of the ship. It rests on a special steel canopy built above the bait tank on the clipper.

Bottom: Pilot Walters is shown stepping into plane as Capt. Oren Dickason points out advantages of having spotter plane aboard. Tuna clipper's boom lifts plane off and onto its resting cradle.

Edna G., Veteran of 50 Years' Lake Service, Gets New Heart

Edna G., an old lady of the lakes will have a new heart (as marine men call a ship's boiler) when spring breaks up the ice and she starts back to work. For more than half a century *Edna G.*, a hardworking Great Lakes tugboat, had been supplied with steam power by the same B & W boiler installed when she was built in 1896. Within the month, she will be equipped with a new boiler.

Shipping conditions and boiler design have both changed and progressed in the fifty years since *Edna G.'s* maiden voyage. New ships for Great Lakes service are heavier and more power is required to handle them. The tugboat will get this added power from a boiler which fills the same space conditions as the old one but furnishes greater steaming capacity at lower cost. The new boiler is a B & W single-pass, header-type boiler, with a water cooled furnace, and is designed for a pressure of 250 psi with an operating pressure of 200 psi.

The boat is owned and operated by the Duluth, Missabe & Iron Range Railway Company, Duluth, Minn., and the reboilering job is being done at Knudsen Brothers Shipbuilding and Drydock Company in Superior, Wisconsin.

Edna G. began her career as a Great Lakes girl, However, she has gone places. During World War I she made a trip to Hampton Roads for wartime service on the East Coast. Equipped with her new boiler, *Edna G.* is expected to go back into Great Lakes service as soon as the lakes are open for shipping in the spring.

Pacific WORLD TRADE

Reg. U. S. Pat. Off.

Undersea Treasure Hunt

By E. O. SCHARETG*

OUT OF THE SINKING of the *Diamond Knot,* the most disastrous collision loss to occur on the waters of the Pacific Coast, there has come about a dramatic success story of a salvage operation so engrossing that it may well find a place among the already chronicled adventures of the world's undersea treasure hunts.

The story is dramatic because it portrays the vision and courage of the underwriters who, after sustaining a cargo loss of approximately $3,500,000, elected to appropriate a sizable fortune for a hazardous attempt to recover a portion of their heavy loss and at the same time restore to the world's critically depleted food markets as much as possible of this cargo consisting of 7,400,000 cans of much needed Alaska salmon. The story is dramatic because it portrays the talent and ingenuity of the marine engineer, who in the face of seemingly insurmountable obstacles, devised and directed an operation which took from the bottom of the sea a precious food cargo which otherwise would have been left to rot and waste away. The story is dramatic because it portrays the skill, daring and sheer nerve of divers, welders, cranemen and many more members of a great team who fought relentlessly against strong tides, vicious currents and other angry forces of nature which appeared determined to help keep this precious cargo in its watery grave.

Our story has its beginning in mid-August of the year, at a time when the irritable waters forming the Straits of Juan de Fuca were hidden from view by a low almost imprenetrable fog. On these waters bound for Seattle was the 5,525-ton MS *Diamond Knot.* In her holds was stored a rich cargo of choice salmon that had been taken from the cold waters of Bristol Bay, Alaska; processed and canned to make up a catch valued at nearly $3,500,000. Nearby was the outward bound 10,681-ton freighter *Fenn Victory.*

A distress call was received from these somber waters

*Marine Claims Dept., Head Office, Fireman's Fund Insurance Co.

Walter Martignoni of Pillsbury & Martignoni, marine engineers, who was in full charge of salvage operations.

A motion picture in color showing the complete salvage operation was shown at the April 1 meeting of the Accident Prevention Bureau of the Waterfront Employers Association, San Francisco; at the April 2 meeting of the Northern California section, Naval Architects and Marine Engineers, at which Mr. Martignoni and the author appeared to add technical explanations; and at the April 7 meeting of the Mariners Club luncheon, San Francisco.

Receiving barge in front and salvage barge in rear.

at about 2 a.m., August 14th. In answer to this call, captain and crew of the *Mathilda Foss* and the *Foss 21,* tugs of the Foss Launch and Tug Company of *Tugboat Annie* fame, sighted the *Diamond Knot* and *Fenn Victory* at a place about six and one-half miles off Ediz Hook. In the black swirling waters and curtain-like fog, the two disabled ships appeared as monsters locked together in a death grip, drifting west on a strong current. The *Fenn Victory* had rammed and cut its way into the *Diamond Knot* at its starboard side between number two and three holds. Rescue crews fought to free the *Diamond Knot* and as the work went on, it was obvious the inflicted wound was fatal.

Death came fast for the *Diamond Knot*. She was eventually cut free from the grip of the *Fenn Victory*. Two tow lines were fastened in an attempt to tow her away from the deep, swift waters of the Straits of Juan de Fuca to shallow, protective Crescent Bay on the Olympic Peninsula. But at 9:50 a.m., the great ship was literally sucked down by the vicious currents that run their course near Tongue Point reef. In a tragic death scene, the heavily loaded ship rolled on her side and disappeared from sight under 135 feet of water. On the bottom she rested on her starboard side with her mast and tangled rigging reaching out toward the tranquil beach at Crescent Bay—not more than five hundred yards away.

A survey of salvage possibilities was ordered immediately. First at hand, however, was the important business of indemnifying those assureds who had sustained cargo losses of tremendous proportions. Among these were some of the world's largest food processors and packers. Evidence of the good faith and service provided by the underwriters is recorded as follows: Claim in the amount of $982,258.55 was paid jointly to one of the principal assureds by the Sea Insurance Company and Fireman's Fund who with their reinsurers shared the business for this shipper. In quick succession a second assured presented claim to Fireman's Fund and was paid in full the amount, $2,053,365.68. Four days later the third principal assured made claim to Fireman's Fund and was paid in the amount of $369,767.10. Each instance of payment of these large claims represented the prompt and wholehearted support of reinsuring underwriters.

There were some who felt that the death of the *Diamond Knot* could only have as an epilogue a still more tragic story of terrible waste. She had taken her precious food cargo with her to a place where undersea operations could only be attempted under the greatest of difficulties. The fast ebbing tides and running currents off Tongue Point were the strongest to be found in all of the Straits. It was here that the Straits narrowed to form a neck through which the waters raced back and forth from their place in the Straits of Georgia and Puget Sound and the sea. Undersea operations under such conditions could certainly end in failure.

Some found in these challenging difficulties the fighting chance to take back from the sea a veritable treasure to be valued not only in money, but in its immeasurable worth to a world in dire need of food. Among those who recognized this challenge were Richard T. Saunders, manager of our northwest marine branch, and Assistant Marine Secretary Arnold R. Bowhay. At the suggestion of Mr. Bowhay, the underwriters, with the acquiescense of all reinsurers, commissioned Walter Martignoni of Pillsbury & Martignoni, marine engineers, to direct salvage operations. Martignoni's long, highly successful career had made him well versed in the ways of the sea, and he above all, was capable of devising and supervising the best means of bringing the sunken treasure to the surface.

First task at hand was to securely anchor a salvage barge over the ill-fated *Diamond Knot,* from which operations could be directed. No easy task at best, this preliminary operation added difficulties when divers reported that the floor stretching out from the rocks off Tongue Point was formed of gravel. Anchors, no matter how large or heavy, frequently slip from their places when sunk in gravel.

Martignoni and his crew supplied by the Foss Launch and Tug Co., strung from the salvage barge an elaborate network of steel-wire and iron chains to which there

Pipes syphon cans from ocean bottom to deck of receiving barge.

UNDERSEA TREASURE HUNT

were attached eleven large anchors ranging in weight from 3,000 to 6,000 pounds. When these mammoth anchors were dropped into the sea, their wire and chain lines were pulled taut and made secure by four logging winches which had been placed on the far ends of the salvage barge. Obstacle one had been overcome.

The real test of ingenuity and courage remained ahead, however. Adventurous men with all their strides have devised few methods of going beneath the sea to grapple effectively with ill-fated cargoes.

During his career, Martignoni had retrieved sunken cargo by putting to work the very waters that sought to hold it. It was with such a scheme he decided to pit his skill against the turbulent and possessive waters covering the *Diamond Knot.* He fashioned two 12-inch pipes of metal and rubber into which air would be forced, creating a syphon that would literally suck the valuable cargo from the sunken ship. Close to the underwater end of this giant syphon, below a second manifold, he designed four openings through which water at more than 150-pound pressure would be jetted, to burst on and rip open the cartons containing the canned salmon. Once free from these cartons, it was hoped the one-pound cans would be drawn to the end of the underwater "vacuum-cleaner" to be pulled up and deposited on receiving scows held alongside the salvage barge.

There was hope in this plan, but no room for absolute confidence. Martignoni had seen the best designs of engines made futile by a tenacious sea, and he knew there remained ahead unforseen and unsolved problems. Precious coins and other small objects of salvage had been taken from the ocean's floor by the syphon method, but would such operation safely raise one-pound cans of salmon?

Over and above the technical problems that might be solved in diligent study, there remained to be contended with, the unpredictable, often destructive antics of weather and sea. The sky held signs of approaching winter with its strong winds that would sweep heavy seas against equipment and men. Calendars for the months to come showed fast-changing tides that in their run would buckle and tear the syphon pipe line. There was no time to lose.

Work became intense. From the Tacoma, Seattle and Port Angeles yards of Foss Launch and Tug Company, men and equipment were assembled at Crescent Bay. From California, material was obtained and hauled from which the syphon line would be fashioned. Special Navy patent underwater cutting rods to cut the steel shell plating and heavy framing of the sunken ship, were flown from Washington, D. C. To ports throughout the Pacific Coast urgent calls were sent, instructing the best available undersea divers to travel by air to the scene of the disaster. On the salvage barge had been assembled cranes with giant booms and cables to lower into place the 140-foot syphon pipes. Mammoth air compressors, jet pumps, welding machines, illuminating plants, logging winches—in all, twenty-seven pieces of vital machinery with gas-driven engines were strategically placed on the barge.

Under the direction of 32-year-old master diver Arthur Walter McCray, there were added to the machinery on hand, decompression chambers, divers' suits and helmets, miles of air and communication lines, lead belts and shoes, and all the accessories which make up the grotesque uniform that enables men to breathe and work under water.

Stakes in the battle were climbing high. More than $120,000 had been expended on equipment alone. Expenses for each day added steadily several thousand dollars to the amounts already expended. There was much to lose.

McCray and his divers climbed down the ladder attached on the side of the salvage barge, to drop below the waters to the upper side of the *Diamond Knot.* At Martignoni's direction, a 9x15 foot opening was cut through the shell plating and web frames covering lower number two hold, where 38,607 cases of salmon were stored. Martignoni's "vacuum cleaner" was off the drafting board and held in place between the salvage and receiving barge. On deck the divers' attendants, with the communication phones pressed hard against their ears, transmitted information from the divers below to the crane operators, who lowered the giant syphon. Below, the divers guided the end of the syphon into the hole made in the ship. Inside the ship, other divers had made their way to the cargo and with stevedore hooks had ripped open a number of water-soaked cartons.

Then, in the din of noise created by the powerful motors on the salvage barge, orders were given to release air into the manifold of the lowered syphon line. There was anxiety in the eyes of Martignoni and his men as they watched the great syphon pipeline twist and turn in the water under the force of air and pressure. Its long neck stretching out of the water and over the receiving barge shook from side to side. Suddenly, from this neck there exploded a charge of water and foam which glistened in the sun as it cascaded to the barge below. Then, the foam gave way to more water until finally a tremendous flow filled the entire opening of the syphon-line and geysered over the barge. In the stream were shining, gold-colored cans of salmon!

Martignoni and his men had won the first round in the battle against the sea. Ahead were sixty days and nights of the grim conflict. In the log of Captain Loring Hyde, former salvage master of the *USS Discoverer* and an assistant to Martignoni, were written a score of stories of the defeats and victories which followed. " . . . Tuesday, Sept. 10. Strong S. W. wind and sea made up. Lines let go on receiving scow to tow into Bay for shelter. Secured syphon, unhooked cranes, lowered booms. Sat., Sept. 27. Tide ebbing, divers forced up. Wed., Oct. 1. Sixth receiving scow with estimated 336,000 salvaged cans left for Friday Harbor. Tues., Oct. 7. Sudden blow, rough sea; west syphon broken. Due to strong ebb, pipe could not be lifted. Delay of 3 to 4 hours. Mon., Oct. 13.

Twelfth scow with estimated 300,000 cans left for cannery. . . ."

The words of Loring Hyde's log were cold and factual, but the incidents he reported made up the despair of riggers who would sweat and toil to secure a line only to have it snapped in two by a rolling, defiant sea; the anxiety and worry of divers' tenders who jabbered nervously through communication lines to their wards working among a thousand dangers under a wall of sea; the cold and weariness that overcame crane operators who sat in their place through long nights of piercing winds and heavy rains; the courage and stamina of barrel-chested divers who, after being forced too quickly from the sea by raging currents, were rushed into decompression chambers to escape the "bends," their most dreaded disease; the exhilaration of those who saw the fighting sea relax momentarily in battle permitting the giant syphon to pour out 200 gallons of water and 1,000 cans of salmon per minute.

Each day and night of the conflict brought Martignoni and his men closer to final victory. A second syphon was lowered into number three hold to suck at its cargo. Soon the port side of the *Diamond Knot* was almost cut away and the two great syphons were moved from hold to hold to take from the sea the precious cargo of food which it had almost come to regard as its own.

The vision and the courage of the underwriters were rewarded when finally two-thirds of the choice salmon was taken from the sea and hauled to canneries at Seattle, Friday Harbor in the San Juan Islands and Semiahmoo near Blaine, Washington. Under the strict supervision of pure food authorities the rich, choice salmon was recanned to be released to the world's depleted food markets.

Latin America Prospect List

Twenty-two thousand new names of firms in Latin America have been added to the 1948 edition of the Latin America Sales Index, published by Dunn & Bradstreet, Inc. This publication, in its tenth year, now lists more than 160,000 enterprises in Mexico, Central and South America and the West Indies.

Each listing contains the firm's name, full address, products or services provided, type of business, and capital rating which indicates financial size and buying capacity. Bank and port facilities, population, and economic activity are listed for each town in the 29 countries of Latin America.

Globe Service to Indies

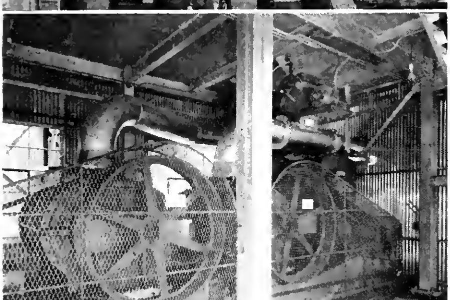
Globe Wireless Ltd. opened radiotelegraph service to the Dutch East Indies, French Indo China, Macao and Malay States on April 1. Messages are sent from San Francisco over Globe's highspeed radiotype circuit direct to Manila and then transferred to Eastern Extension Cable Co. for delivery in these Far Eastern countries. The company's vast expansion program contemplates extension of service to other Oriental countries as rapidly as trade justifies it.

Globe Wireless pioneered in Transpacific radio communications and before World War II handled traffic to all Oriental points. Manila and Shanghai installations, lost to the Japanese when hostilities began, were rebuilt and service restored in 1946. Other points have been added as fast as conditions permit and with this latest tariff amendment approved by the Federal Communicaitons Commission, Globe Wireless radiogram service is now available to the Hawaiian Islands, the Philippines, China, Hongkong, Macao, Indo China, Java and Malaya, including Singapore. Globe also operates to Havana, Cuba.

Left to right: Harold Champlain, Chairman; Harvard P. Stewart, Vice Chairman; Soule Knapp, Executive Committee; Leslie White, Secretary-Treasurer; George Crow, Executive Committee. Not shown are Moritz Jaehne and William Warren, both on the Executive Comittee.

At the Naval Architects meeting in San Francisco April 2, at which the complete salvage operation described in "Undersea Treasure Hunt" was shown in a colored film, the above officers were elected.

BULK COPRA FACILITIES AND LONG



The Metropolitan Stevedore Co. pioneered the use of the suction method of handling copra in Long Beach in 1929. Metropolitan has now a fleet of 10 blower machines, four of which are all electric and six powered with 8 cylinder Buda Diesel engines, developing 160 H.P. each at continuous service. The four electric blowers are mounted on solid rubber-tired chassis. The 6 Diesel driven blowers are mounted on 3 axle trailers and are capable of obtaining a road speed of 40 M.P.H. The overall load rating being 51,000 lbs. These blower machines were built by the Sutorbuilt Corp. at 2008 E. Slauson Ave., Los Angeles, which firm is headed by Mr. Robert S. Clark, one of the original designers of this type of equipment.

Work has been recently completed by the Metropolitan Stevedore Co. for six pipe lines into which the copra is delivered at the Spencer-Kellogg plant located on Cerritas Channel adjacent to the Ford Ave. Bridge, Terminal Island.

◄ AT LONG BEACH

Top to bottom:
Conveyor line running to warehouses.
Typical product recovery unit emptying into a dry conveyor which enables the copra to be dropped wherever desired.
From the common garner bin through rotary seal valve and into conveyor line.
Pipe nesting in dock warehouse.

Copra being blown into the three product recovery units and then dropping down into the garner bins.

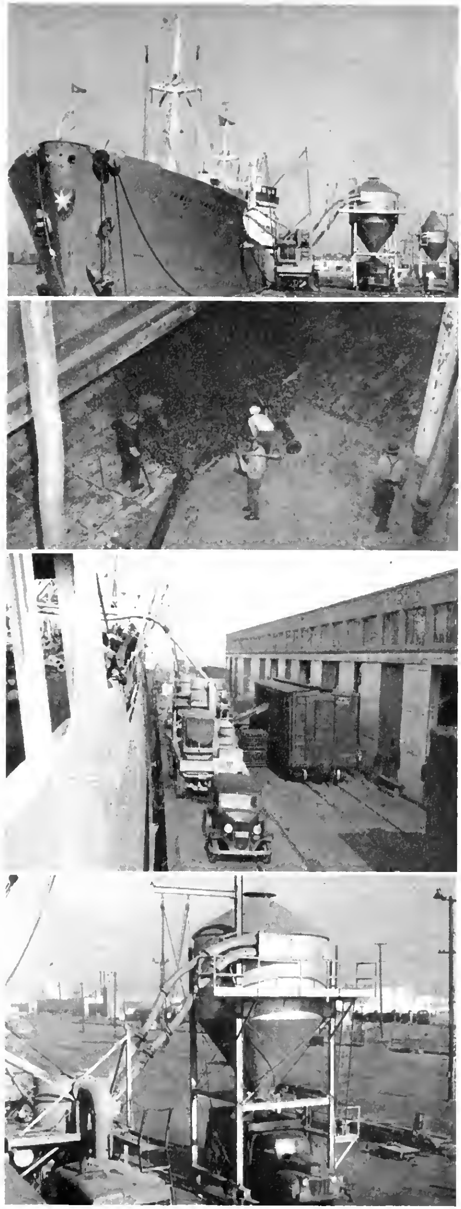
HANDLING AT OAKLAND BEACH HARBORS

The idea of the pipe line, which is 10″ Penflex flexible, is to deliver the copra from the exhaust side of the portable machines into three product-recovery units, located at the top of the scale house, situated adjacent to the wharf. The copra then passes from the product recovery units into three garner bins and is then dropped into scales located on the top floor of the scale house at which point it is weighed. After weighing it is then dropped into a common garner at the bottom of which are two vane-feeders or seal valves, (also manufactured by Sutorbuilt Corp.) which deliver the copra into a pair of 14″ pipe lines and is then blown into the warehouses some 400 to 500 feet away.

Each pipe line is constructed to handle up to 80 tons per hour.

An expansion program at Spencer-Kellogg plant is nearing completion and it is expected that this plant will crush between 400 and 500 tons of copra daily.

AT OAKLAND ►



Top to bottom:
The Trein Maersk of the Fred Olson Line discharging copra at the Seventh Street Unit of the Outer Harbor Terminals.
Workmen feeding copra bulk to the pipes of the Port of Oakland copra blowers in the hold of a ship at the Seventh Street Unit of the Outer Harbor Terminals.
Port of Oakland copra blowers at work discharging a ship directly into railroad box cars.
Port of Oakland copra hopper receiving copra at the side of a ship for loading onto trucks.

Robert S. Clark, one of the original designers of this method of unloading copra. Mr. Clark is head of the Sutorbuilt Corp., Los Angeles.

Junior Foreign Trade Association Meetings

LOS ANGELES

At the speaker's table, left to right: Brae Loveless, Pacific Far East Lines; Gordon Behr, speaker; Ed Austin, Yaras & Co.; George B. Spain, George B. Spain & Co.

Lower picture: Another table at the meeting.

At the March 9th meeting of the Junior Foreig Trade Association of Southern California, Gordon Beh Manager of the Japanese Division of Yaras & Compan spoke on "Trade and Industrial Reconstruction in Japan In his talk Behr pointed out the lack of major ra materials in Japan necessary for her rehabilitation. B cause of this lack of raw materials, Japan's industri chemicals are in short supply and her textile indust very greatly hindered. Her pre-war sources of suppl imported from other countries of Asia, are no long available since those countries are nearly as destitute Japan. Behr stated that one of Japan's greatest obstacl to her rehabilitation is her tremendous population some 80 million people.

A record crowd attended the meeting. At a rece meeting of the Board of Directors, Miss Toni Uri was voted into membership in the Association, becomin the second woman member to join.

Top picture, below: W. Kendrick, Edwin Harry Pentland, Ken Hollingshead, Dennis M. Piper, Mel Johnson, Mitchel J. Simuns, and Arthur G. Schade.

Center, left to right: Irv Augur, Art Anderson, Pat Mc-Faull, Ed Myers, Herb Porter, and Glen Middlesworth.

Bottom picture: W. F. Ranken, Sudden & Christenson; R. A. Andersen, S. & C. Overseas Corp.; J. A. Liautaud, Kerr S.S. Co.; L. J. McCormick, S. & C. Overseas Corp.

SAN FRANCISCO

FUEL OIL DOLLARS

(Continued from page 63)

crease of 1,500,000 B.T.U.s per barrel and still fall short of obtaining 85%. 85% value equals 4,953,375 B.T.U.s per lb.—What we can get. 55% value equals 3,204,125 B.T.U.s per lb.—What we are averaging. Difference, 1,749,250 possible savings.

All of the moisture that enters into the process of combustion must be evaporated at the expense of the furnace. Since most fuels commence a combustion cycle at about 70° F. and leave the stack at approximately 400° F., 1200 B.T.U.s are wasted for each pound of water in or with the fuel. In addition, vaporization of water with the atomized oil interferes with the process of combustion, preventing efficient combining of the elements entering the process. As engineers, we know that water expands six thousand times when changed to superheated steam. Accordingly, one drop of water released from an oil burner tip can cause considerable interference. Some engineers have the impression that steam used in the atomizing process, affects the flame to produce higher temperatures.

To obtain the maximum efficiency from fuel, particularly fuel oil, it is very important that combustion be completed within the cone of the flame, without any loss of time. It is not only necessary to effect good atomization, but also necessary to convert the minute fuel particles into a gaseous state before combustion can be completed.

If we improve atomization, we automatically accelerate conversion to a gaseous state, increase the speed of combustion, resulting in more perfect combustion. Reduced interfacial tension, produced by the use of our fuel oil treatment, is the easiest approach to this end result.

If sulphur is present in the fuel, as it always is, it will react with the boiler metal to form sulphur compounds at the expense of the metal. The deposits of combustion will also be compounds of sulphur.

As the rate of combustion increases with a relative increase in temperature, the carbon content of combustion deposits decreases rapidly. With modern firing methods and subsequent higher furnace temperatures, to find 7% of true carbon combined in the deposits even in uptakes and breechings, is considered excessive. In fact, it is an exception to find any carbon at all. With these high furnace temperatures, new combustion deposits are now formed on boiler heating surfaces, and they are far more difficult to remove than those formed by burning fuel at lower rates of combustion. Much of the deposits which form on the heating surfaces of modern boilers are such that they cannot be removed by the use of soot blowers alone. The hard deposits which form on radiation and superheater tubes, and in many cases which bridge across from tube to tube, sometimes even necessitate the use of bars and sledge hammers to dislodge from between the tubes.

Certainly these products are not "soot," as defined by Webster. From personal experience and observations on some of our most recently installed boilers, deposit removal is quite serious.

While all oil fired boilers do not create deposit problems to the extent of plugging tube spaces with rock-like deposits, there is hardly an oil fired job that does not produce a "cornflake" type of deposit, commonly called fire scale, on radiation tubes. I doubt if there is an engineer who has not observed this type of deposit, given it a snap analysis and labeled it "carbonized oil."

My analysis of this deposit constituted one of the principal reasons for the work we are still doing. I found these "corn flakes" to be a composition of ferrous sulphide, ferric oxide and ferroso ferric oxide (magnetic oxide).

This corn flake structure of deposit is also one of the principal causes of failure of refractories installed on furnace floors. As most engineers are aware, small amounts of iron hasten destruction of the best refractories. Unfortunately, there is no way to prevent the pieces from falling from the tubes. We can, however, help to prevent their formation by chemical means, and by so doing, increase the life of refractories.

As all engineers are aware, when starting a boiler from "cold," the boiler metal sweats, and considering the characteristics of the gases, and the products of combustion previously given, we know that CO_2 does not condense. The product of hydrogen being water or steam will condense on the cold boiler metal.

Steam and sulphur dioxide combine quite rapidly during the process of combustion to form another product known as sulfurous acid. In so doing the 1.8 pounds of water and 6.4 pounds of sulphur dioxide obtain 1.6 pounds of oxygen to form 8.2 pounds of sulphurous acid gas.

During the period of raising steam in a boiler and bringing up the inside temperature, the tremendous metal surface acts as a condenser. Sulphurous acid has a dew point of approximately 309° F., so you will see that condensation goes on for quite a long time.

But we are not yet finished, for water is also condensing with the H_2SO_3 to produce 9.8 pounds of sulphuric acid from the original 3.2 pounds of sulphur. Analysis indicates the final concentration to be $2H_2O + 2H_2SO_4$. This continues to form until the temperature of the metal exceeds the dew point.

As the boiler is brought up to operating temperature, the moisture content of the acid is evaporated, leaving a black sticky gum deposit on the tubes' surfaces.

Formation of Sulphur Compounds
(Fig. 5)

The liquid acid compounds and gum drip from tube to tube, reacting on the metal to form another group of sulphur compounds.

Sulfuric acid plus iron yields ferrous sulphate, releasing hydrogen. Regardless of the type of boiler, if there is sulphur in the fuel, you will find this characteristic grey-white deposit directly on the

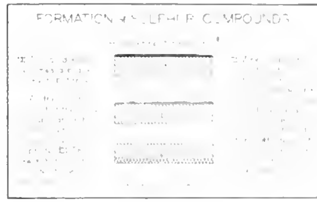


Fig. 5

metal, and under any other deposits that may form.

Now as a further chemical process continues, the ferrous sulphate loses its oxygen to form ferric sulphide, silicon, aluminum, and calcium from the ash content combine with this product to form various sulphates, sulphides, and oxides.

When subject to radiant heat on that part of the boiler heating surface exposed to the fire, the final reaction of sulphur is to combine with the surface metal, to form ferrous sulphide. The degree of this reaction, and the speed and extent vary greatly from boiler to boiler. We do not wish to scare any engineers or to convey the impression that your boilers are about to fall to pieces. One set of boiler tubes may deteriorate from sulphur reaction in a year or two. Another set of tubes may last 25 or more years. We can prove definitely that the reaction occurs and that the combustion deposit formation is directly proportional to this sulphur reaction.

It is the opinion of many engineers that blisters are caused by oil or foreign matter on the water side of the metal. However, please note that the position of many blisters is remarkably coincidental with sulphur dripping from tube to tube from the baffle above, affecting a local area on the radiation tubes. (Fig. 6.)

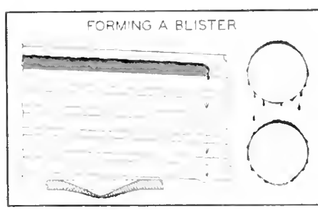


Fig. 6

It is the opinion of many engineers that cross checking is due to constant expansion and contraction of the metal. That, because the tube is fastened to the drum at both ends, the bend is the weakest section. Analysis and observation also indicate that the lower part of the bend is the logical position for sulphur compounds to collect when falling or draining from upper tubes. In any case

(Please turn to page 106)

Marine Insurance

The London Letter

By Our United Kingdom Correspondent

Chamber of Shipping Report

The portion of the annual report of the Chamber of Shipping of the United Kingdom which most directly concerns marine insurance people is that which refers to the Comité Maritime International. The reconstitution of the "Comité," which held its first post-war Conference at Antwerp in September last, was, indeed, one of the most notable events of the year. Its re-establishment, after a break of 10 years, as the organization composed of shipowners and other business interests and maritime lawyers qualified to deal with questions of maritime law was, in itself, sufficient justification for the conference, which opened under the chairmanship of the acting-President, Lord Justice Scott.

Amongst the important matters dealt with at the Conference, and now commented upon by the Chamber of Shipping, was the Convention on the Immunity of State-owned Ships. This Convention, which was drawn up over 20 years ago but not generally enforced, aims at international uniformity in providing the same legal rights in the case of State-owned ships engaged in commercial trading as exist in the case of privately-owned ships. So far as the Courts in Britain are concerned, this has now been provided for by the Crown Proceedings Act, "but the Convention is still necessary," the Chamber reports, "to enable British private owners to sue foreign State-owned ships in our Courts and vice versa."

With regard to the rate of interest in connection with the York/Antwerp Rules, it is now recorded in the Chamber's report that British underwriters urged the adoption of a fixed rate of interest not exceeding 4 per cent, instead of the "legal" rate provided in the Convention (or 5 per cent , if no legal rate exists). The Conference agreed that the reference to "legal rate" should be deleted, but did not express any concluded view as to the fixed percentage which should be adopted.

Air/Sea Salvage is also discussed in the Chamber's report. The British representatives at the Antwerp Conference urged the need for a clear definition by the air interests of the nature of assistance which can, in practice, be rendered by ships to aircraft, before proceeding with any Convention on this subject, and to the desirability of co-ordination with the Inter-Governmental Maritime Consultative Organization in the likely event of this matter being referred to them. On the legal aspect, they made it clear that British shipowners would oppose any provision for compensation for saving life apart from salvage of property. The matter was referred to a sub-Committee for fuller study in cooperation with the Governments and organizations concerned. The next conference of the Comité Maritime is provisionally fixed to take place in Amsterdam in 1949.

Address Before Liverpool Institute of Export

In an address which he delivered before the Liverpool Branch of the Institute of Export, Mr. Harold H. Mummery, underwriter and manager of the marine department of The London Assurance, dealt with the question of the theft and pilferage of goods in transit. After pointing out that there are sitting, at the present time, a number of individual committees, "studying the question of packing, studying this all-important matter of theft and pilferage, and how the latter can be avoided," Mr. Mummery said:

"The secret of combating this evil of theft and pilferage is that an adequate system of supervision should be set up at all stages of the journey. Thieves are active during packing, and en route from the shippers' warehouse to the port; they are active in the area of the port. In certain instances goods have been stolen whilst on board the carrying steamer; they have been stolen at ports of transhipment; and thieves have been active at the port of destination.

"I would like to couple with my proposal in regard to the matter of supervision a suggestion that the market should once again introduce the Institute Theft, Pilferage and Non-Delivery (Shipping Value) Clause. By so doing, we should throw upon the consignee a greater sense of responsibility to see that he makes every effort to take despatch, as provided for in the Institute Cargo Clauses (Wartime Extension)."

Irish Institute

There is a newly-formed underwriting organization in this part of the world—to wit, the Irish Institute of Marine Underwriters. The inauguration of this body is regarded as a valuable adjunct to the British marine insurance market—indeed, to the world market. The Institute was created by the three Irish companies, but the 12 offices of British companies operating in the Dublin market quickly sought membership, so that it is now a thoroughly representative body. Mr. Carl Briner, president of the International Marine Insurance Union, has sent a congratulatory message to the new Irish Institute on its formation.

International Marine Insurance Union Meeting

Fourteenth September, 1948, has been fixed as the date on which the next annual meeting of the International Marine Insurance Union is to be held—the date, of course, being subject to no change having to be brought about owing to unexpected circumstances in this troubled post-war world. The meeting will this time be held at Noordwyk, in Holland.

OIL TANKER DESIGN

(Continued from page 57)

Cargo Pumps and Piping

One of the most important features in a tanker is its cargo pumps and piping. Where a vessel can dock or leave without restriction, the turn-around period is fixed by the time required to discharge the cargo; assuming that all ships' business can be transacted in this time. Therefore, it is an asset to handle the cargo as rapidly as possible. For economical operation of the vessel, the type of pumping equipment should be complementary to the propulsion machinery installed. The determination of pump capacities and pipe sizes is often influenced by the owner's shore facilities, and in many cases the discharge rate of the tanker installation is greatly in excess of the dock systems to which they are connected. The time interval for handling a full carge varies from ten to twenty hours. The discharge pressures vary from 90 psi to 125 psi.

The location of the cargo pump room has been previously discussed. The present trend in the selection of pumping machinery is to use centrifugal pumps for the main units, and rotary or reciprocating steam pumps for the strippers. The main pumps are usually driven by steam turbines or electric motors. With the midship pump room arrangement, the electric motors are mounted vertically in a separate gastight enclosure on the Upper Deck in order to minimize the spark hazard. The motors are usually of the totally enclosed type. With the pump room located aft, the motors or turbines can be located in the propulsion machinery space, driving the pumps which are located in the pump room by means of horizontal shafting through the bulkhead. Totally enclosed waterproof motors are normally used in this case. Variable speed controls are installed in both cases.

The cargo lines are usually standard black steel pipe, maximum diameter 14 inches, with welded flanges. The joints are made up with trunk board gaskets and are bolted. Bulkhead connections are weldments consisting of short lengths of extra heavy pipe penetrating through the bulkhead and welded to it, with flanges welded at both ends. Expansion in each line is taken up by some form of patented or stuffing box coupling or expansion bend. If a relief valve is fitted on the discharge side of the cargo pump the valves and other fittings may be of cast steel. Suction castings are made of cast iron. The tank valves are commonly gate valves, brass mounted, fitted with non-rising bronze spindles. Valve operating rods should be of cold rolled steel, have greater strength than the valve stem, run in straight vertical leads if possible, be fitted with a universal joint in the line and be rigidly braced at frequent intervals. Each rod should pass through a stuffing box at the deck over which is mounted a fabricated steel deck stand fitted with open and shut indicator.

The arrangement of cargo piping is dictated by the trade requirements of the owner. A tanker carrying a straight cargo requires a simpler system than one that transports many grades. In any case, cross over connections should be provided so that cargo may be handled by any line in any tank, and that simultaneous pumping can take place with at least two grades of cargo. A preliminary piping arrangement should be prepared in the early design stages to insure clearances of bulkhead stiffeners, webs, etc. Suction is facilitated by having the pumps and suction lines as close to the bottom of the vessel as is practicable. Main suction lines are usually laid at the level of the top of transverse floors in the tanks and stripper lines are reeved through the floors in way of manhole openings. Stripper lines are usually 4" or 6" standard steel pipe.

The main loading and discharge connections are usually located on the Upper Deck, about amidships, Port and Starboard; in addition some vessels are fitted with a cargo line over the stern. Hose connections should be arranged several feet inboard of the rail to provide a working clearance for handling oil hose.

Tank venting and vacuum relief systems should be fitted in accordance with the requirements of the U. S. Coast Guard and other regulatory bodies.

To satisfactorily pump cargoes of heavy oil, it is necessary to preheat the oil by means of heater coils in the tanks. Heater coils add weight, increase cost, complicate tank cleaning and cause trouble through freezing and bursting, therefore they are not recommended as a routine installation for all tankers. The coils should be installed at a level of about 6 inches above the bottom of the tank, and proportioned at the rate of about one square foot of heating surface to 125 cubic feet of tank volume. Steam is usually supplied at 125 psi. The coils, consisting of 1½ inch extra heavy seamless pipe, are fabricated by welding.

The hazard of an explosion resulting from the ignition of hydrocarbon vapors can be minimized by the installation of an inert gas system that blankets the tanks with CO_2, eliminating support of combustion thereby. The CO_2 is extracted from the flue gases in the boiler uptakes, passed through a scrubber and cooler, and pumped into the tanks while the cargo is being discharged. In the loading operation, the CO_2 and accumulated explosive vapors are vented off through a flame arrestor located at the mast head. Positive pressure is maintained in the inert gas system through all phases of operation.

All cargo and fuel tanks must be fitted with steam smothering connections for fire extinguishing in accordance with U. S. Coast Guard Regulations; 1½" steel pipe is commonly used and the minimum steam pressure is 100 psi. The machinery spaces and cargo pump room are commonly protected against fire by the installation of CO_2 systems.

When it is necessary to clean tanks, they are washed down by jets of hot salt water (200° F.) sprayed by a special machine at a pressure of 175 psi against deck heads and bulkheads, removing oil residues together with accumulations of scale and rust. The tank cleaning machine is inserted into the tank through a special deck plate. It consists of a small turbine driving rotary and opposed nozzles mounted on a shaft. The hot salt water is supplied by the fire mains which are designed to serve the dual purpose of tank cleaning and fire fighting, heaters being installed in the line.

Conclusion

The scope of this paper is inclusive of many of the phases of tanker design. The author has taken the liberty of presenting only the general aspects of each phase in

(Please turn to page 96)

Admiralty Decisions

By HAROLD S. DOBBS *of San Francisco Bar*

WITHHOLDING SEAMEN'S WAGES

As a part of the duties of the master while at sea and in foreign ports, he has the additional responsibility of keeping complete and accurate accounts of seamen's wages, drawings and "slop chest" accounts. (Slop chest is a colloquial description of a ship's commissary.)

Congress has seen fit to enact many laws to protect the seaman with respect to the payment of wages and any other sums due for overtime or allowances of one kind or another. They must be paid at certain times and under certain conditions, failing which the master subjects himself to certain fines and penalties.

The case of *Shilman v. United States of America and Grace Line, Inc.* decided by the United States Circuit Court of Appeals of the Second Circuit in the latter part of 1947, has come to my attention and I believe presents a most interesting review of the law of rights and liabilities of both the shipowner and the seaman in the matter of wage demands and forfeitures and penalties. In the Shilman case, the libellant sought the recovery of two hundred dollars in wages earned by him as a member of the crew of the merchant vessel *Eli Whitney*. In the lower court, libellant was unsuccessful, and he appealed to the United States Circuit Court of Appeals. The *Eli Whitney* was owned by the United States and operated by Grace Line, Inc. as agent, pursuant to the usual agreement. The libellant was employed on the vessel as a wiper, and while so employed, earned the sum of approximately $406.00 as wages between May 25 and August 1, 1943.

One day, during the period of time that the vessel was in the Port of Tunisia, North Africa, then an active theater of war, the libellant was arrested by personnel of the United States Army for stealing an adding machine from the office of the French Navy. He was tried before a Special Court Martial, found guilty and sentenced to pay a fine of two hundred dollars to the United States and to be confined at hard labor for three months. He served his prison sentence but never paid the fine. Grace Line paid him the sum of $206.00, which represented the net sum after deducting the fine of two hundred dollars. The position of respondents in the lower court was simply that the United States was entitled to the two hundred dollar fine and therefore they deducted it from the sum due libellant. The Circuit Court of Appeals reversed the decree as against the United States and affirmed it as to Grace Line, Inc.

It seems clear from the statutes applicable to seamen's wages, that the United States cannot lawfully withhold any part of a seaman's wages because of a fine such as was imposed upon the libellant in the instant cause.

A seaman making foreign voyages is entitled to his pay within twenty-four hours after the cargo is discharged, or within four days after the seaman is discharged, whichever happens first. Failure to pay without sufficient cause subjects the master or owner to an extra payment of double wages for each day's delay. 46 U.S.C., 96, R.S. 4529.

In port, a seaman is entitled to demand one-half of his unpaid wages, and when his employment is at an end, he must receive the remainder of the wages due. So important did Congress feel this provision was, that the section was expressly made applicable not only to American seamen, but also to foreign vessels in United States harbors. 46 U.S.C. 597, R.S. 4530.

Except as expressly provided by law, a seaman cannot give up any right to wages, or any remedy for the recovery of same, even by agreement. 46 U.S.C., 600, R.S. 4535.

His wages are not subject to attachment or arrestment, even by court action, except that a court is given the limited power to order wages withheld, only for the support of a wife and minor children; and no advance assignment of wages is valid, except for payment of an allotment to a relative made out in the manner authorized and prescribed by law. (46 U.S.C., 601, 38 Stat. 1169 (1915).

Section 682 (46 U.S.C.), R.S. 4580, provides that where a seaman is discharged in a foreign port, it must be in the presence of the United States Consul, and, even before the actual signing off, the master must make "payment of the wages which may then be due said seaman."

Section 683 (46 U.S.C.), R.S. 4581, provides that if the consul fails to require all the wages to be paid to the seaman when there is to be a discharge in a foreign port, the consul himself becomes liable to the United States "for the full amount thereof."

Section 685 (46 U.S.C.), R.S. 4583, requires the consul to make sure that there is paid at the time of discharge all wages which are due (plus extra wages, in the event of certain violations of the seaman's contract).

The above sections look toward payment to the seaman by his employer, at the termination of the employment, of all of his earned wages, without any deductions except those which are expressly authorized by statute.

The section prohibiting "attachment or arrestment" of seaman's wages came before the Supreme Court for consideration in *Wilder vs. Inter-Island Navigation Co.*, 211 U.S. 239. There a judgment had been rendered against a seaman in a local court of Hawaii and it was sought to reach his wages in proceedings in aid of an

execution upon the judgment which had been returned unsatisfied. The Supreme Court in an opinion by Mr. Justice Day, after discussing the authorities, held that the act applied and that the wages could not be seized under the statute of the Territory. In reaching this conclusion the Justice said:

"But we are of opinion that this statute is not to be too narrowly construed, but rather to be liberally interpreted with a view to effecting the protection intended to be extended to a class of persons whose improvidence and prodigality have led to legislative provisions in their favor, and which has made them, as Mr. Justice Story declared, 'the wards of the admiralty.' *Harden vs. Gordon*, 2 Mason, 541, Fed. Cas. No. 6, 047 (C.C. Me.).

"We think, too, that the section is to be construed in the light of and in connection with the other provisions of the Title, of which it is a part. * * *

"Section 4536, therefore, has the effect of not only securing the wages of the seaman from direct attachment or arrestment, but further prevents the assignment or sale of his wages, except in the limited cases we have mentioned, and makes the payment of such wages valid notwithstanding any 'attachment, incumbrance of arrestment thereon.'

"It seems to be clearly inferable from these provisions that wages which have thus been carefully conserved to the seaman were not intended to be subject to seizure by attachment, either before or after judgment. * * *

"We think that these provisions, read in connection with sec. 4536, necessitate the conclusion that it was intended not only to prevent the seaman from disposing of his wages by assignments or otherwise, but to preclude the right to compel a forced assignment, by garnishee or other similar process, which would interfere with the remedy in admiralty for the recovery of his wages by condemnation of the ship. These provisions would be defeated if the seaman's wages, to be recovered at the end of the voyage, could be at once seized by an execution or attachment after judgment in an action at law. The evident purpose of the Federal statutes, that the seaman shall have his remedy in admiralty, would be defeated, and the seaman, in many cases, be turned ashore with nothing in his pocket, because of judgments seizing his wages, rendered, it may be, upon improvident contracts, from which it was the design and very purpose of the admiralty law to afford him protection."

You have undoubtedly heard the expression that a seaman discharged in a foreign port is entitled to receive his wages "without any deduction whatever." A literal translation of the expression does not satisfy the rule as it has been followed in practice. For example, when a seaman refuses without reasonable cause to join his vessel or absents himself therefrom without leave, the expense of hiring a substitute may be deducted from his wages. Other grounds are available to the master for the imposition of penalties and forfeitures where a seaman fails to abide by the statutory requirements.

The appellees cited a number of cases in support of a set-off of two hundred dollars. An examination of these cases revealed to the court that they properly fall under the category of expenses incurred on behalf of the ship in connection with the voyage. Sometimes they have related to hiring a substitute for a deserting seaman, or for securing his return, and other miscellaneous reasons.

In the case at bar the respondents are not seeking to recover any expenditure caused during the course of the voyage, or for the benefit of the ship, but to avoid payment to a seaman on his discharge of the wages he had earned which the statute says must be then paid. There is no evidence that the ship or her owner suffered any loss by reason of the stealing of the adding machine from the French Authorities which indeed, according to the statement made at the time of the argument of the appeal, was returned to the owner on the same day. It seems evident that under the statutes the libellant was entitled to the payment of the full amount of the wages he had earned on August 1, 1943 when his employment terminated and that no authority existed which justified withholding any part of the wages in anticipation of a court martial fine which was subsequently imposed, or to assert a set off in the present suit for the balance of libellant's wages.

The reason the decree of the lower court dismissing Grace Line, Inc. was affirmed is that libellant, as a seaman, sought recovery on a contractual basis of employment, and whereas in this case the United States was a disclosed principal and Grace Line indicated its capacity as agent, the shipping articles must control and therefore the agent must be released from any liability. An examination of the shipping articles quickly revealed that the United States was disclosed as owner and Grace Line as agent for the owner.

Some time ago, I reported the interesting case of *Hust v. Moore-McCormack Lines*, 328 U.S. 707, in which the court permitted recovery under the Jones Act against the agent or operator of the vessel where the damages claimed were those for negligence which were imputed to the operating agent. Libellant, in the instant case, felt that his claim was one that would be properly assessed against the agent as well as the United States. However, as I said before, the basis of libellant's case is contract and the Hust case is negligence of the agent.

You may also recall the case of *Caldarola v. Eckert*, 332 U.S. 155, reported to you not too many months ago, in which a stevedore sued the general agent for injuries caused by a defective boom on the vessel on which he was working and the court denied recovery from the agent.

In other words, the court in each case failed to hold the agent to be owner of the vessel.

Therefore, in the Shilman case, as a practical matter, the United States was prevented from bringing a suit against Shilman because the funds which were still in their hands were not subject to attachment, arrestment or garnishment. Because of the nature of the seaman's possessions, it would be extremely difficult and probably more expensive than the sum involved, to attempt to follow the seaman's assets and obtain payment.

A fellow doesn't last long on what he has done. He's got to keep delivering as he goes on.—CARL HUBBEL.

On the Ways

Tanker to Carrier to Tanker

With a notable war record behind her, the SS *Sangamon*, recently purchased by Hillcone Steamship Company of San Francisco, is now undergoing reconversion for use as a commercial tanker just as she was in prewar days when owned by Standard Oil Company of New Jersey. She was then the *Esso Trenton*. The ship is being reconverted by the Alabama Dry Dock and Shipbuilding Company, Mobile, Alabama.

Known as one of the "Old Indispensables" because of her war record as an Escort Aircraft Carrier, the *Sangamon* was decommissioned by the United States Navy October 24, 1945. At that time her officers and crew and accompanying air groups were presented the Presidential Unit Citation "for extraordinary heroism in action against enemy forces in the air, ashore and afloat."

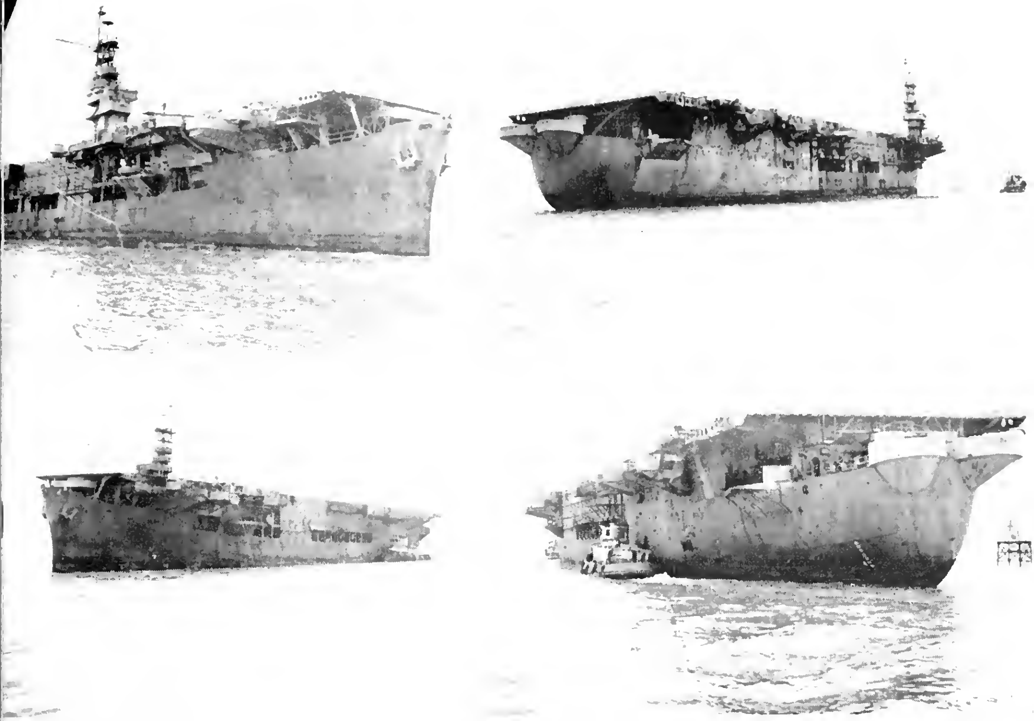
The manner in which the *Sangamon* was seriously damaged in the Battle for Leyte Gulf was described in Navy news releases as follows:

"Although seriously damaged when struck by a Japanese suicide bomber plane on May 4, the *Sangamon* succeeded in retiring to a rear area under her own power. Her outstanding record of destruction to the enemy's vital ships, planes and emplacements is evidence of the *Sangamon's* fighting spirit and the gallantry and skill of her officers and men which enhance the finest tradition of the United States Naval Service."

The *Sangamon's* carrier-type acoutrements such as landing decks and hangars are being removed, and the ship is being refitted for use as a commercial tanker.

The *Esso Trenton* was one of the original "national defense" tankers built in 1939 by Federal Shipbuilding and Drydock Company. She was 553 ft. overall with a cargo capacity of 146,024 barrels and a pumping rate of 8,000 barrels an hour. She was twin screw of the *Cimarron* class with a speed of 18 knots.

The Moran Towing & Transportation Company's ocean-going tug, Joseph H. Moran II, pulls the Sangamon into Mobile port.



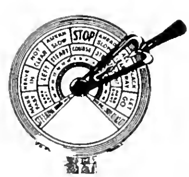
The Sangamon viewed from all sides while in Mobile River en route to the Alabama Dry Dock and Shipbuilding Company. Top left, the starboard side looking aft; top right, starboard quarter looking forward. Bottom left, port view looking aft; bottom right, port side looking forward.

Another Cruise Ship for Pacific

The veteran cruise ship George Washington at the Todd Hoboken yard prior to being fully reconverted for the Seattle to Alaska run. Recently purchased by the Alaska Transportation Company, she was built in 1924, is 390 feet long overall, 54 feet wide, and 17 feet in depth, with accommodations for 250 passengers, and is expected to be in her new service by May.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

The Use of the Rude Star Finder

Most all deck officers are familiar with the use of the Rude Star Finder in its most common usage—that of determining the altitude and azimuth of stars prior to observations or that of identifying stars by their altitude and azimuth after observation has been made. Such cases present no problem if the Star is one of the 55 major navigational stars which are tabulated in the Nautical Almanac. However, we sometimes make observations of stars which are not listed as major navigational stars and after failing to identify them on the Rude Star Finder, throw away the observation. This is not necesary and in reality indicates one of two things—either the navigator is quite possibly not too ambitious or he lacks some knowledge which is necessary for the efficient navigator. A little study will reduce these possibilities to one.

First, let us consider the principle upon which the Rude Star Finder is constructed. In the center, we have the Elevated Pole. Around the Pole are equidistant circles of Latitude or Declination for every ten degrees out to zero degrees. Outside of this we have a larger circle graduated in degrees from zero to three hundred sixty. This outer periphery with the symbol for the First Point of Aries at the zero degrees mark is set up for the local hour angle of the First Point of Aries which we find from Tables 1 and 2, or if you use the Air Almanac the L. H. A. of the First Point of Aries may be determined by merely applying your Longitude to the G. H. A. of the First Point of Aries as tabulated for the G. C. T. of observation.

If neither of the above methods is available, the L. H. A. of the First Point of Aries may be determined by finding the Local Siderial Time and converting it to arc, using the tables found on Page 2 and 3 of the Nautical Almanac. These tables are separated into two groups; the first giving the Greenwich Siderial Time for zero hours Greenwich Civil Time or the R. A. M. S. plus 12 hours, and the second giving a correction for the difference in the speed of the sun and the speed of the stars for the number of hours past zero hours Greenwich Civil Time that the observation is made. (NOTE: Here is where the greatest number of errors are made in using these tables as this second table is named Correction for Longitude.) Make sure you pick out the correction for the G. C. T. and don't stop then and total up the R. A. M. S. plus 12 First Point of Aries and the correction for the G. C. T., but add to these figures the G. C. T. as well. Then total them all and you have the Greenwich Siderial Time or if you convert this time to Arc, you have the G. H. A. of the First Point of Aries. If you apply your Longitude in Time to Greenwich Siderial Time you, of course, have Local Siderial Time or if you apply your Longitude to the G. H. A. of the First Poinr of Aries, you have the L. H. A. of the First Point of Aries. REMEMBER THIS: the G. S. T. and the G. H. A. of the First Point of Aries are the same except that one is expressed in time, the other in arc. So also are the L. S. T. and the L. H. A. of the First Point of Aries the same.

As an example to aid in clarifying the above explanation, let us assume a position in Latitude 20 degrees North and Longitude 120 degrees West on June 1, 1948 at 0500 L. C. T. or 1300 G. C. T. On pages 2 and 3 of the Nautical Almanac we find: In the first table Siderial Time of Zero hours G. C. T. In the second table correction for 13 hours G. C. T. or

	h	m	s				
R.A.M.S. + 12^h =	16	- 37	31.8				
Corr. for 13^h G. C. T.=		2	08.1				
G. C. T. of observation=	13	00	00.0				
	29	39	- 39.9				
	24						
G. S. T. =	5	39	- 39.9	or			
G. H. A. of the First Poinr of Aries =					84°	54′	58.5″
Longitude in Time	8	00	00.0	—L.	120°	00′	00.0″
L. S. T. =	21	- 39	-39.9		35°	05′	-01.5″
					360°	00′	-00.0″
L. H. A. of the First Point of Aries=					324°	54′	58.5″

In my opinion a simpler and more valuable way of determining the L. H. A. First Point of Aries is to throroughly familiarize yourself with an equation which should be in the mind of every efficient navigator. The equation is this: The G. S. T. or G. H. A. First Point of Aries = to the Right Ascension of a star plus the G. H. A. of that star. So also is the L. S. T. or L. H. A. First Point of Aries = the Right Ascension of a Star plus the L. H. A. of the star. This equation is valuable in more than one phase as far as this article is concerned as you will see as we progress. All that is required is to take out the Right Ascension of any star as it is tabulated in the Nautical Almanac for a given month. Convert this to Arc. Add to this the G. H. A. of that particular star for Zero hour G. C. T. and the correction for the G. C. T. of observation as is tabulated on pages 214, 215 or 216 of the Nautical Almanac. The total of these is the G. H. A. of the First Point of Aries.

As proof and explanation, let us use the same data that was given for our previous example. June 1, 1948 0500 L. C. T. Longitude 120 degrees West and at Random use the Star Rigel—

	h m s			
R. A.	5 12 01.4 =	78°	00′	21″
G. H. A. for 0^h G. C. T. =		171°	22′	36″
Corr. for 13^h G. C. T. =		195°	32′	00″
		444°	54′	57″
		360		
G. H. A. First Point of Aries		84°	54′	57″

We differ from the previous example by 1.″5—do any of you navigate to a closer extent than that?

The value of this equation was really the motive for this article. As previously mentioned many good sights are thrown away because of being unfamiliar with this equation and not knowing what to do with a sight which doesn't seem to work out.

Again as an explanation let us use the data used in the previous examples, June 1st, Latitude 20° North Longitude 120° West 0500 L. C. T. An unknown star was observed to bear approximately 060° at an altitude of 41°. With our Rude Star Finder we set up the 20° Template with the cross in the center of the template on the 20° circle with the 0° 180° line passing through the pole in the center of the Star chart and the degree mark on the outer periphery of the chart equal to the L. H. A. First Point of Aries which we found in the previous example to be approximately 325°. With our template thus set up looking along the 60° bearing line at an altitude of 41°, we see that there is no star shown there. The most common thing to do now is to discard this sight; but wait, let's use a little common sense. We know we observed a star at that altitude and approximately that bearing so there must have been one there. So—by looking at the point of intersection of the 60° bearing line and the 41° altitude curve we see on the star chart under the template that if a star had been plotted there, its declination would have been about 35° North. Now by placing a straight edge of some kind on our template so that it passes through the Pole in the center of the Chart and the point of intersection, we read on the outer periphery of the chart approximately 19°. *This is the Right Ascension in Arc.* Converting this to time, we have a R. A. of 1^h 16^m. So now we know our unknown star had an approximate declination of 35° North and an approximate Right Ascension of 1^h 16^m. With this data we can look on page 217 or 218 of the Nautical Almanac and find a star which has approximately this R. A. and Declination. Here we see that the star Mirach on Jan. 1, 1948 had a Right Ascension of 1^h 06^m 48.7^s with an annual variation of + 3.36 seconds or on June 1st, its Right Ascension to the nearest second was 1^h 06^m 50^s and its Declination on the 1st of Jan. was 35° 20′ 44″ and increasing at a rate of 19.1 annually, or on June 1st its declination to the nearest second was 35° 20′ 52″ N. *So this must be the star we observed.* Now going back to the Equation— L. H. A. First Point of Aries = R. A. of a star plus the L. H. A. of the star, we can see that if we subtract the R. A. of this star from the L. H. A. First Point of Aries, we will have the L. H. A. of this star which we need to work out our sight. So with the L. H. A. First Point of Aries of 324° 54′ 58″ that we found in the first example, we can work as shown here—

L. H. A. First Point of Aries =	324°	54′	58″
R. A. Mirach in Arc =	16°	42′	30″
L. H. A. Mirach =	308°	12′	18″
	360°	00′	00″
"t" East of Mirach =	51°	47′	42″

So, with this Meridian angle and the Declination, we can solve our sight as we would any other sight and with an equal degree of accuracy.

The lengthy explanation of this method of using the Rude Star Finder for the identification of the less prominent stars which are tabulated on pages 217 and 218 of the Nautical Almanac may cause some navigators to pass it up deciding that this requires too much effort. However, with just a little practice it becomes quite simple and at times on some rare occasion, this information may be deemed almost invaluable.

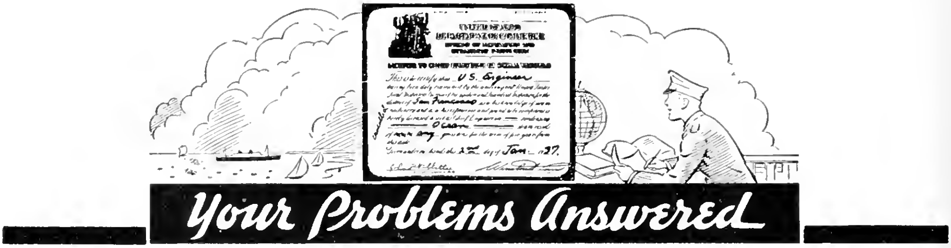
In order to get the most from this article, the reader should have available and use a Rude Star Finder and a 1948 Nautical Almanac as he reads to check up on what is actually being done.

Merchant Marine Officers Needed For Active Duty

Merchant Marine officers, who are members of the Naval Reserve, may now apply for one year's active duty starting July 1, Naval Reserve Merchant Marine representative in Twelfth Naval District has announced.

Applicants will be interviewed by Captain F. W. and lieutenants (jg), preferably without previous active duty, with deck and engineering classifications to serve on combat ships, amphibious craft and Naval transports.

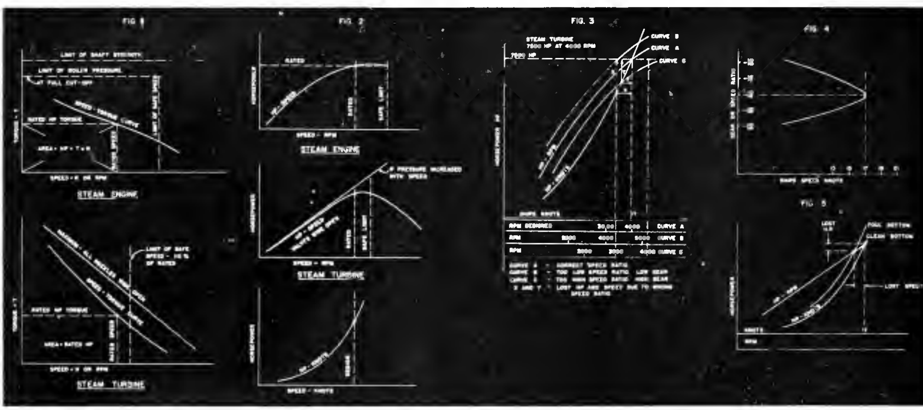
Applicants will be interviewed by Captain F. J. Wauchope, USNR, Merchant Marine Naval Reserve representative, 233 Federal Office Building, San Francisco.



by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

"CHALK TALKS" ON APPLIED MATHEMATICS



Blackboard figures 1 to 4 mentioned in the text.

Gear Ratio For Propulsion

THE SUBJECT OF THE PROPER GEAR RATIO in any mechanical or electrical application is as important as any major factor in the design, yet little will be found on the subject in the text books or elsewhere. Its selection is just as critical as the piston diameter and more important than the selection of the steam pressure. A 5% error in the gear ratio gives us a 5% error in the performance. In this CHALK TALK we would like to make this clear even though the Marine Engineer can do little if anything about it. He can of course, recognize improper gear ratio and call it to the attention of the Port Engineer and Naval Architect.

First, let us make it plain what is meant by *gear ratio.* While this is the common term used, a more proper term is *speed ratio.* This is because *increase* in gear ratio means *decrease* in final output speed for any speed reducer mechanism, while *increase* in speed ratio means *increase* in final output speed. Notice that high gear of the automobile is the lowest gear ratio. To avoid confusion we will use the term speed ratio to mean output or propeller speed divided by turbine speed. It will be a fraction such as 120/480. Or if in even numbers it will be, for instance, 1 to 4 instead of 4 to 1 as is customary.

The speed ratio is just as important to the ship or

locomotive as it is to the small boy and his bicycle where the speed ratio is a compromise between that low value needed for the hills and a high value for the level or down grade. Every one of our readers, we are sure, has at one time in his career pushed his bike up a hill and wondered why he could not ride it up just as he can walk up. It is all a question of speed and torque and their product horse-power.

We must start this study from the speed-torque curves of the engines. Fig. 1 shows these curves for the engine and the turbine. They are different because of the different principles involved. In these curves the abscissa (horizontal calibrated line) are marked off in speed units or RPM or N as shown, and the ordinate is calibrated in torque T pound-feet. (The ordinate is the vertical calibration.) Therefore, by very definition of horse-power the area under the curves is numerically equal to the horse-power at any specific point on this *speed-torque curve*. A point taken at rated HP and speed is indicated and the corresponding area marked out. The engine curve is difficult to mark out because it must be taken at a constant cut-off and at a speed (rated) much less than it could probably run. Note the limitations, however. As an upper limit of torque we have the steam pressure and mechanical strength. We must not increase torque to the point of twisting the shaft to a permanent set. The area of the piston also limits torque. Also, we have a limit in speed beyond which we might wreck the engine. And finally with wide open throttle and full cut-off as the speed increases we find that the steam cannot get through the pipe and valves fast enough to keep the pressure up on the piston, and torque is reduced.

Similarly with the turbine we find that is surrounded with limitations. At full steam at the wide open throttle, the torque at standstill will be in the general neighborhood of 1½ to 2 times full load normal torque. And roughly the fullstream runaway speed would be about twice the rated value. It would burst from excess centrifugal forces long before it reached this speed which gives rise to the safe sped limit indicated on the chart.

Notice that both the engine and turbine have some excess HP over and above the rated value to take care of, providing rated HP at reduced pressures or other variables.

Now if we were to select several points along the *speed-torque* curve and calculate the corresponding horse-power we could again plot these values in a curve which would then be the *hp-speed* curves. These are shown in Fig. 2 for both the engine and the turbine. By not marking any numbers on the abscissa and ordinates we are indicating that these curves indicate trends only and are to be taken as mathematically correct. The rated and speed limit lines are shown. Note that we apparently have limits to the HP. If the reader recalls statements made in CHALK TALKS in previous issues to the effect that we can increase HP with speed on any engine he may question these limits. With the engine we can increase HP with speed as long as the engine stands the stress and we can get the steam out of the boilers through the pipe and the inlet and exhaust valves. With the turbine we will have to increase the pressure to keep the steam jet velocity up to the usual value of about twice the wheel blading velocity.

Finally, in Fig. 2 we find the *hp-speed* curve of a ship We call this curve the *hp-knots* curve because the abscissa is plotted in *knots* of ship speed. Our problem now is to superimpose the *hp-speed* curve of the engine or turbine on the same abscissa and ordinates as the *hp-knots* curve. If we are careful to plot the knots ship speed and RPM shaft or turbine sped to an adjusted scale so that for any particular speed ratio or propeller pitch any particular RPM comes at the same point on the abscissa scale as the corresponding knots, then in plotting both HP-Speed and HP-Knots curves, the curves will intersect at the point of operation. Note that a different HP-Speed curve is necessary for each different throttle opening, and that the ship operates at the point of intersection of its HP-Knots curve and the HP-Speed curve for the particular throttle setting. Fig. 3 shows these curves superimposed on each other. The heavy double line is the abscissa for the ships HP-Knots curve. There are three other abscissa for the turbine HP-Speed curves, one, the upper marked curve A is for the rated and design condition. The next marked curve B is for a condition of too low speed ratio or too high geared. The last is marked curve C and is for a condition of too high speed ratio or too low geared.

Assume that 4000 RPM is the rated turbine speed and 4400 is the maximum safe speed. Then curve B with the speed ratio too low finds us up to 4000 RPM with ship's speed low and ship's required HP low leaving considerable HP capacity in the turbine unused. In fact, we have to throttle the turbine to keep it from overspeeding.

And curve C with the speed ratio too high or too high geared finds us running at only 3200 RPM and unable to develop the necessary HP at this speed to bring the ship's speed any higher. Both conditions are deplorable and inefficient and the only difference is the gear ratio or speed ratio or propeller pitch. We could well afford to drydock the ship and change propellers.

The distance line X between curve B and the HP-Knots curve is excess available HP, not used because of the speed limit on the turbine. The horizontal line X is corresponding lost ship's speed. The distance lines Y show lost HP and ship's speed because of the limit in the turbine at this too high speed ratio.

Fig. 4 shows a plot of *speed-ratio* to *knots* and indicates how critical the selection of this ratio is. We can definitely lose speed with the wrong ratio. Note that with a foul bottom we must use another ship's HP-Knots curve as shown in Fig 5. Here we not only lose speed but also horsepower that would otherwise be available. This accounts for the very marked speed reduction due to a foul bottom. We would lose only a part of this speed if we could change the speed ratio as the bottom becomes foul. In other words a variable pitch propeller as used by airplanes would be good for a ship. (It has been tried and really works but is complicated and expensive.)

Our next article will discuss these principles with the automobile, showing the need for more than one speed ratio and illustrating the fact that the automobile can make more speed in conventional gear than it can in overdrive. The article will also discuss how to recognize wrong speed ratio in a ship and what can be done about it.

Running Lights

LUCKENBACH'S PRESIDENT SINCLAIR VISITS PACIFIC COAST

Vincent McMurdo, Pacific Coast Manager (left), and James Sinclair, President, Luckenbach S.S. Co.

On an extended visit to the Pacific Coast, Mr. Sinclair told of his company's plans for weekly scheduled operations intercoastal with its new C2 and C3 vessels, some of which are now being converted in western shipyards.

on Visits Detroit Diesel Distributor

. C. Genn, General Sales Manager, Detroit Diesel ne Division, General Motors Corporation, on a brief is to the Coast last month included a visit to the new e of the West Coast Engine and Equipment Com- on Ashby Avenue in Berkeley, the newest distrib- of Detroit Diesel Engines.

ur staff photographer met Mr. Genn at the San Fran- Airport for this picture as he was leaving for the thwest.

V. C. Genn, General Sales Manager, Detroit Diesel. ►

rkey Machinery Founder Dies

arine executives—men of every station who "go n to the sea in ships"—were shocked to hear of the len death, February 29, of C. H. Markey, president founder of the Markey Machinery Company, of tle. Mr. Markey died of a heart ailment, after only eek's illness. He was 70 years old.

H. Markey came to Seattle 46 years ago from Mil- kee, Wisconsin, where he was born in 1878. He and associates built a schooner, *The Alice*, and for four s they traded with the natives along the Alaska t as far north as Point Barrow, bringing back furs. e founded the machinery company which bears his e in 1906 and was active in the management of it until the week of his death.

uring the recent war, Markey Machinery—a name dy known throughout the Seven Seas—did much k for the Navy, designing and producing marine liary machinery. The founder's son, William Markey, niversity of Washington engineering graduate, who been associated with the business for the past two des, will become president of the Company.

Naval Architects and Marine Engineers Hear Kooistra on Marine Refrigeration

(His paper will be published in a future issue.)

John F. Kooistra, Carrier Corp.

ommenting on the Kooistra paper were, left to right, be- w: Lester L. Westling, Matson Navigation Co.; Marshall . T. Garlinger, Asst. Marine Supt., ATS; Walter W. Sand- olt, York Ice Machinery Corp.; John Marsh, George Swett & Co.

Pictures taken at the first meeting of the Southern California Chapter of Naval Architects and Marine Engineers. Speaker's Table, left to right: Art Pegg, International Paint; W. P. Warren, Principal Surveyor of Pacific Coast, Amer. Bureau of Shipping; W. M. Laughton, speaker, General Manager, Pacific Coast Dist., Bethlehem Steel Company Shipbuilding Div.; Karl French, Marine Surveyor; Morris Weitzner, speaker, Chief Engineer, Bethlehem Steel Shipbuilding Div.; Herb Pickering, W. H. Wickersham & Co.; Jack Gilbride, Todd Shipbuilding.

At the right are some of the new officers. Left to right: Jack Gilbride, Art Pegg, Karl French, and Harry Summers.

New Southern California Chapter, Naval Architects & Marine Engineers

With an attendance of approximately sixty members, the first meeting of the Southern California Chapter of Naval Architects and Marine Engineers on March 2 was a memorable success foreshadowing a bright outlook for its future program.

The elected officers of the chapter were Karl French, chairman; Harry Summers, vice chairman; Arthur Pegg, secretary-treasurer; Herbert Pickering, John Gilbride, and Kenneth M. Walker, executive committee.

Karl French spoke on the preliminaries to the first meeting of the organization, and Art Pegg, as secretary-treasurer, gave a report. The advantages of the society were outlined by Morris Weitzner, a past president of the Northern California Chapter, who touched on the importance of mutual exchange of knowledge, the common language and common problems facing all members of the profession, the educational value of speakers for the organization and the value of group fellowship, and the benefits of such a group to the Marine industry as a whole. He also mentioned the problems confronting a new society in getting capable officers and good speakers. The success of the Northern California Branch was attributed by him to the assistance of all local marine men and the publication of the Society's technical papers.

Organizing of the Northern California Society and the problems incurred in that organization were told to the new society by past president of the Northern California Society, William B. Warren. W. Miller Laughton, another speaker from the Northern California Society, urged the new Southern California Chapter to remain

Around the table are: R. C. Rogers, Marine Interests, Inc.; Wayne A. Johnson, San Diego Marine Construction; Joe Hare, USMC; J. C. McKnight, American Bureau of Shipping; Elmer Powell, Bethlehem Steel; John Black, American Bureau of Shipping; B. C. Knerr, Consolidated Steel.

Left side of table: Paul Hiller, Paul Hiller Co.; Ed McKenzie, C. F. Braun Co.; Sid Griffes, Shell Oil Co.; Tom Forster, Forster Shipbuilding Co.; Bill Lambie, Lambie Co. (end of table).

Others at the table are William Crawford, Crawford Navigation School; C. W. Lapworth, Merle J. Davis & Associates; Lt. Comdr. Cochran, San Diego Naval Station; Colin Davies, Consulting Engineer; C. Bruce Newby, Clinton Newby, Jr.

professional rather than social, and to keep well organized for united action in their field. He, too, stressed the importance of technical papers and interchange of knowledge within the organization.

A paper titled "Obsolete Navigation in a Modern World" was read at the meeting, and the meeting ended with the reading of the by-laws which were voted on and accepted.

Top picture, left side of table: W. P. Crawford, Technical Speaker, Crawford Navigation School; H. B. MacLeod, Retired Commander, USN; Paul V. Gaudin, American Pacific; Burt Hale, Marine Solvents Corp. End of table: Benjamin Reed, Naval Architect and Marine Engineer. Right side of table: Burt Pegg, Marine Solvents Corp.; Pat Ryan, Joshua Hendy; Bill Harrington, Bethlehem Steel; C. J. Aguinaldo, Marine Engineer; Phil Finkelstein, Long Beach Naval Yard; W. C. Harris, Long Beach Naval Yard.

Lower picture, left side of table: R. J. Causland, Ralph Parkins Engineering Co.; V. W. Hird, Union Oil Co.; Fred Hoblit, Lockheed Aircraft. Right side of table: Dean B. Johnson, San Diego Marine Construction Co.; L. E. (Ted) Geary, Long Beach Naval Architect; Mylos Redos, Harbor Boat Co.; Art DeFever, Naval Architect, San Pedro; Dair N. Long, Dair N. Long & Associates.

Frank Groves Company Expands

The Frank Groves Company recently announced the expansion of their San Francisco branch. They have moved to a new, larger building at 144 Spear Street, San Francisco. The company is engaged in the manufacture and distribution of power, marine and industrial engineering specialties.

Aldrich Pump Company

M. J. Gigy and Associates, 110 Market St., San Francisco, and Arthur Forsyth Company, 3150 Elliott Ave., Seattle were recently appointed new representatives for the Aldrich Pump Company of Allentown, Pa., manufacturers of high pressure pumps for the marine field.

Gigy and Keays Form New Company

M. J. Gigy & Associates, a new organization at 110 Market Street, San Francisco, has just been formed by M. J. Gigy and V. R. Keays both of whom were formerly with Carswell Marine Associates and Cargocaire Engineering Corporation.

They will function as direct agency representatives on the Pacific Coast for the following companies: Aldrich Pump Company, Lake Shore Engineering Company, M. L. Bayard & Company, Inc., Hydraulic Supply Manufacturing Company, Piezo Manufacturing Corporation, The Tregoning Boat Company, and Seaboard Machinery Corporation. Their line of marine equipment will include pumps, cargo and topping winches, both D. C. and the new A. C. "Magi Winch" and "Siporter" (SIde PORT loadER), sliding watertight doors and control mechanisms, metal hatch boards, steel booms, deck boxes, anticipating governors, rolling hatch beams and several specialty items.

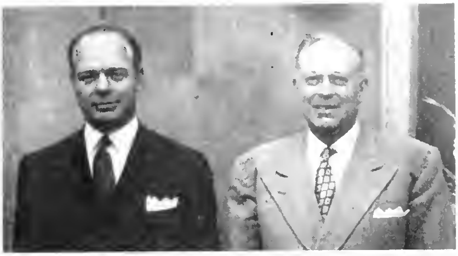
A large quantity of component and repair parts for use in connection with this equipment is available and the company will provide complete engineering service.

V. R. Keays (left) and M. J. Gigy.

The San Francisco Propeller Club Meeting March 17

Twentieth Annual Bilge Club Banquet held in Los Angeles February 21. Additional pictures of this group will appear next month.

International Cementers Open House



G. S. McLaren (right) was in charge of preparations for the Open House of International Cementers, assisted by F. M. Carlisle (left).

At the Open House, top picture, left to right: V. E. Dyckman, The Dow Chemical Co.; J. D. Chesnut, Executive Vice President and General Manager, International Cementers; Frank Smith, California Division Manager, International Cementers; Fred E. Lusk, The Dow Chemical Co.

Center, left to right: E. P. Hollywood, Administrative Supervisor, International Cementers; C. F. McMahan, Chemical Supervisor, International Cementers; Jack S. Smith, Vice President and Manager of Operations and Sales, International Cementers.

Bottom picture shows John Petty, International Harvester Co., and Jack Smith with some of the guests.

A gala "open house" party was held recently by International Cementers, Inc., to celebrate officially the opening of their new general offices and service buildings in Long Beach. The event was attended by a crowd estimated at twelve hundred customers, suppliers and other well wishers from all over the state.

The Long Beach District warehouse, garage and offices for their cementing and chemical services, completed in July 1947, and the new laboratory building and administrative, accounting and California division offices, just recently completed, were all open to the public. All the executive and general offices and the Southern California service facilities are now at one central location for more efficient handling of their large service business.

The district service buildings are of coated corregated iron over steel framework and are well distributed for efficient storage and maintenance of the massive trucking units. Office and laboratory buildings are of contemporary design with construction of concrete block with steel sash. The reception hall of the main building is a high ceilinged unit from each side of which extend long low wings which contain private offices on one side and the general offices, vault, conference room and utility rooms on the other. The offices are colorful and well lighted with the outside done in pastel shades of green and rust, and light and dark green and birch wood paneling within. An important part of the International Cementers service is the import pre-job testing which is conducted in their new modern, compact laboratory. Perliter and Soring were the engineers for the new building.

On display at the "open house" were some of the latest cementing trucks and auxiliary equipment set up to demonstrate how they perform their important work in the oilfields. One of the new PL-7 trucks with the massive pumps capable of developing sustained pressures of ten thousand pounds per square inch and over was hooked up to a new model "aerated" bulk cement truck which delivers the cement from the rear of the container on "ribbons of air." Also shown were export models of cement equipment and plastic cementing units. Of more interest to the marine trade were the large chemical cleaning units which are extensively used in the marine field for cleaning boilers and steamship pumping equipment.

New building of International Cementers.

Duke's Packing Company Opens San Francisco Office

Ronald H. Mercereau, managing partner of Duke's Packing Company of Wilmington, announces the opening of a district office at 400 Drumm Street, San Francisco.

Duke's Packing Company specializes in marine and industrial packings adapted for the marine trade, and in repair and service of galley ranges which they began after recently acquiring the Pittsburgh Sales Company of Wilmington.

The Southern California Branch of the Company at Wilmington, of which L. W. O'Bryan is manager, maintains 24 hour service and supplies parts at Los Angeles Harbor.

Both the Los Angeles and San Francisco offices are distributors for Quaker Pacific Rubber Company, and the Los Angeles office is a distributor also for Durametalic Packings, Sea-Ro Packings, Rains wood-metallic packings, Navalon (Ramie), and Stern Tube and Pump Packings.

The Company expects to extend range work to their San Francisco office in the near future.

Left, Ronald H. Mercereau, managing partner, Duke's Packing Company.

Below, Lawrence T. Mersereau, manager, San Francisco branch of Duke's Packing Company.

Duke's Packing Company Office.

L. W. O'Bryan, manager, Southern Calinia branch of Duke's Packing Co.

SERVING THE MERCHANT MARINE

(Continued from page 42)

machinery manufacturer must at all times be in a position to furnish men who are fully experienced in marine installation and repair work, survey mechanical and electrical equipment, conduct tests, and furnish engineering reports to the ship owners and to their own employers. For instance if a rotor has wiped a bearing and scored its journal, the journal will be resurfaced and the bearing remetalled to suit, but the new dimensions of the journal and bearing will be placed on record at the factory and distributed to all marine superintendants and marine warehouses.

The service engineer accompanies the owner's representative on board new arrivals, his mission being to advise the owners on the operating condition of the machinery, to recommend refinements for higher efficiency, or to suggest repairs. This service is highly appreciated by the owners and it is a boon to ships' engineers to know that they will be met upon arrival where they may freely discuss the operation of their plant.

Service engineers must also be available to supervise electrical repairs on shipboard and make complete surveys of all electric apparatus. This service is particularly necessary on account of the switch-over from steam to electric auxiliaries and on account of the large fleet of electric-driven tankers and passenger vessels.

The Service Man like the proverbial "Horse Doctor" must be able to diagnose ailments without the slightest hint from the patient. He must depend upon his thermometer, his listening device and his pressure gauge, but above all he must be able to draw upon a fund of experience which masquerades under the name of wisdom.

Interior Designs For Uruguay

(Continued from page 46)

alcoves.

Over the center section is a dome, used in this case as a main source of illumination for the bar area. The lighting of the dome emanates from a light trough on to an off-white sand finish, an excellent reflecting surface. Supplementary to this lighting in the outer areas of the room are square flush lighting fixtures set into an accoustical ceiling.

The furniture showwood is a pale rift oak. The banquettes, easy chairs and some arm chairs, are upholstered in a blue textured fabric flecked with black and white. Other easy chairs are upholstered in chartreuse top grain leather. The curtains are white, embroidered in a lineal overall pattern in rose and grey. The decking is black rubber.

An unusual feature of the room is the snack grille where cocktail canapes are prepared. A special cabinet was designed for the purpose and to permit the cooking and other utensils to be stored out of sight when not in use.

Punte Del Este Club—Veranda Cafe

The Punte del Este Club is located at the aft end of the promenade deck house and overlooks the Lido Court and swimming pool. Stainless steel doors that open the aft end of the room completely to the outdoors, creates a lanai affect. In keeping with the outdoor feeling, the furniture of this room is treated in a veranda-like fashion with rattan chairs and tables.

The rather small marine type windows at the sides are framed picture-fashion with rift oak mouldings framing the sea vista. These windows pierce an overall painted wall decoration, executed by Helen Treadwell, of tropical junglesque patterns. This decor is rendered in three tones in keeping with the general color scheme; background of warm brownish-grey with flora and fauna in blue, with highlights of white. All upholstery in this room is a bright red plastic-coated fabric.

The small intimate bar is faced with a tufted front of top grain leather in the same tone as the background of the decor. The ceiling is silver leaf to catch and softly reflect the strong accents of the room. The only curtains in this room are in way of the aft folding doors, in order that the area might be apparently closed from the "weather" on stormy days and nights.

The decking is a terrazzo of black marble chips set in black magnesite.

First Class Dining Room

In the center area of the room, a large round, removable smosgasbord table is located. When this table is removed, large circular area is left to be used as either a space for entertainment, or a small dance floor.

When motion pictures are to be shown, a concealed screen is lowered from the lighting trough just in front of the sculpture. Over the central arrangement is a curved dome from which the color mood of the room can be changed at will, for in the lighting trough are banks of colored lights. These colored lights are equally balanced primary colors which, when used in full intensity, add up to a brilliant white light and can be, by dimmer control, changed to any color of the rainbow. Concealed also in this dome are spot lights, accenting the smorgasbord table; the captain's table; and the sculpture.

The flexibility of this room should allow it to be one of the most useful on the *Uruguay*.

The ceiling is a dead white marine type accoustical tile with the dome area in sand finish texture, an off-white of high reflective quality.

The showwood of the dining room furniture is ebonized. Serving table tops are black plastic and table tops are black linoleum. All tables are equipped with adjustable and removable sea rails. The upholstery mohair is a green grosgrain.

The outboard linings are equipped with glazed windows in front of the airports. These windows are lighted from behind and add an outdoor glow to the room. The windows are equipped with off-white venetian blinds.

The curtains are green with a lush embroidered pattern in a design which may have been inspired by butterfly forms. This embroidery is executed in heavy chenille in brown, white and yellow.

The decking, which follows the pattern of the circularly arranged tables, is a magnesite terrazzo in two colors; one, black marble chips with black magnesite; the other, Verde antique green marble chips in grey magnesite.

Cabin Class Dining Room

The cabin class dining room is an interesting example of the blending of old and new. The original mahogany

(Please turn to page 95)

SHIP BUILDING REVIVING IN A BIG WAY

Out of the rumors of new ship construction programs come announcements as follows:

The U. S. Lines has submitted plans for a 48,000 ton liner, and the Maritime Commission will seek a special appropriation to cover its construction.

The American Export Lines has invited bids for construction of two 23,000 ton liners, and the Maritime Commission has asked for new bids on the five V-2000 13,500 ton liners for "Around the World Service." These bids are returnable April 30 and all five vessels may be built in one yard.

On April 5 Bethlehem's Quincy Yard closed a contract with the Texas Company for four 595 foot super tankers, and Bethlehem's Sparrow Point Yard has closed orders for four 18,000 ton tankers and three 28,000 ton tankers.

Navy plans for 49 passenger ships and 104 fast tankers are still in the rumor stage.

* * * * *

MORE ON THE U. S. LINES NEW LINER

The ship designs were drawn by Gibbs and Cox and call for a vessel between 900 and 1,000 ft. in length with accommodations for 2,000 passengers and a crew of 1,000, speed to be 28½ knots. In emergency the soldier capacity would be 12,000 as compared with 8,000 on the America. The Maritime Commission likes the plans and will presumably ask for a special appropriation and call for bids about June 1.

* * * * *

UNITED ENGINEERING DEAL DISCUSSED BY MATSON AND TODD

Negotiations between Todd Shipyards Corp. of New York and Matson Navigation Co. toward purchase of Matson's subsidiary United Engineering Co. of Alameda are still in progress and probably will "drag on another two or three weeks." This was the reported comment of John E. Cushing, president of Matson.

* * * * *

TEN NEW FERRIES FOR PUGET SOUND

Nickum & Sons, naval architects of Seattle, have been commissioned to prepare plans for 10 steel auto ferry boats by the Washington State Toll Bridge Authority for the State. Six are to be 100-car and four are to be 60-car capacity. They are to be of steel, Diesel electric, 16 knot speed, and costing a total of $8,000,000.

* * * * *

NO SHIPS TO BE TRANSFERRED UNDER MARSHALL PLAN

House action, deleting from the Marshall Plan Bill authority to charter American ships to foreign nations, was hailed by West Coast shipping as "apparently removing one big obstacle in the path of long range planning for American shipping."

Another amendment, by Representative Bradley (R., Calif.) was adopted requiring that 50 per cent of all ERP cargoes move in American ships.

* * * * *

NEW S. S. AGENCY

A general steamship agency, to be known as Commercial Marine Company,

Inc., has been opened at North Bend, Oregon, to cover the Coos Bay Area. Capt. W. J. (Whitey) Wilkinson is secretary and treasurer and general manager, and A. P. Patten, marine surveyor, is president of the new firm.

Capt. Wilkinson spent twenty-two years with the Alaska Steamship Company and five years with the Nelson Steamship Company. He was the first marine superintendent for the Luckenbach Steamship Company in Seattle.

Over one million dollars is expected to be spent in dredging out the Coos Bay Area so that lumber can be shipped on large ocean-going ships.

* * * * *

STEEL FABRICATING PLANT ESTABLISHED IN RICHMOND

Establishment of a Richmond branch plant of the Butler Manufacturing Company to offer the West fabricated steel products was announced through the Industrial Department of the San Francisco Chamber of Commerce.

The firm, whose home office is in Kansas City, is located in 12½ acres leased from Santa Fe Land Improvement Company. The new plant will represent an investment of almost a half million dolllars in building and equipment.

* * * * *

CHOICE OF SAN FRANCISCO FOR CONFERENCE AFFIRMED

GENEVA, Switzerland (ILO)--The ILO's Governing Body, at its December meeting here, affirmed its decision of last July to hold the 1948 session of the International Labor Conference at San Francisco.

The session will begin June 17, and will last about three weeks.

* * * * *

EASTERN INDUSTRIALIST PURCHASES S. F. FIRM

Reflecting the increasing interest of eastern industrialists in San Francisco Bay Region industrial opportunities, Richard F. Bellack has acquired the Butte Electric & Manufacturing Corporation of San Francisco, according to Forrest Tancer, Manager, Industrial Department of Sutro & Co., who negotiated the transaction.

* * * * *

MARITIME AGENCY JOINS FIGHT OVER RAIL-WATER RATES

The Maritime Commission has joined with intercoastal carriers in asking the Interstate Commerce Commission to continue its inquiry into water-competitive rail rates, regardless of the outcome of the railroad petition to increase rates generally throughout the nation.

* * * * *

DEL MONTE BECOMES NAVY POSTGRAD SCHOOL

The Navy plans to shift all of its advanced study programs to Del Monte, Calif., during 1951.

If Congress grants the Navy $26,000,000 during fiscal 1950 for Del Monte expansion, postgraduate courses at Annapolis, Newport and Anacostia will be moved West the following year. That sum is in the Navy's fiscal 1950 budget, officers told a House committee. Purchase of the Del Monte Hotel property has been completed by the Navy.

* * * * *

NAVY PLANS

A report from Washington on April 1 states that the Navy has agreed with the Budget Bureau that plans may proceed for a 80,000 ton aircraft carrier and the conversion of three others. Said to be included also are undersea tankers and other experimental types.

* * * * *

COAST GUARD BASE AT LOS ANGELES

Coast Guard headquarters at San Francisco announces plans for a $1,000,-000 base at Los Angeles Harbor.

* * * * *

INDUSTRIAL DEVELOPMENT IN SOUTHERN CALIFORNIA

During the month of January, 19 new factories were established in Los

Angeles County with a total investment of $1,448,000. Thirty-one (31) existing plants were expanded, calling for an additional investment of $2,299,000, and creating a total of 543 new industrial jobs.

For the year to date, 234 new factories were established with a total investment of $71,300,000, and creating 8,502 new jobs, 448 existing plants were expanded, calling for an additional investment of $57,258,500 and creating 14,078 new industrial jobs.

Total investment for the year to date in the 682 new and expanded units was $128,558,500, creating a total of 22,580 new jobs.

REVERE COPPER & BRASS INCORPORATED, Rome, New York, has purchased over 12 acres at the southwest corner of Slauson and Garfield Avenues in Los Angeles on which it will construct a plant to make seamless copper and alloy tubing and brass rod.

KAISER COMPANY, INCORPORATED, Iron and Steel Division, Fontana, has begun operation of its $7,000,000 steel pipe manufacturing plant. Production of black and galvanized pipe will be 145,000 net tons annually.

* * * * *

INDIA PLANS INDUSTRIAL DEVELOPMENT PROGRAM

The United Provinces of India Government is planning a program of industrial development in connection with which it desires to obtain American technical assistance, as well as quotations on required plant and equipment, according to a report from the American Embassy in New Delhi. This program calls for installation of the following: Two each; Textile mills, including power generating plants; contact sulphuric acid plants, electrolytic caustic soda plants and one acetate rayon plant; as well as the development of heavy and medium engineering industries, and manufacturing of ammonium nitrate and urea, viscose acetate rayon, plastics, and heavy chemicals. It is also planned to expand and modernize the following industries: Cotton and woolen textiles, alcohol, glass, vegetable oils and soap, leather goods and paper and woodwork.

* * * * *

ONE WEST COAST YARD'S OPERATIONS

Vessel	Owners or Agents & Representative	Remarks
USAT DAVID C. SHANKS	U. S. Army Trans. Corps	Conversion
MV ALGORAB	Pillsbury & Martignoni	Conversion & Engine Repairs
USAT FRED C. AINSWORTH	U. S. Army Trans. Corps	Conversion
MV HILO	Pillsbury & Martignoni	Survey
USAT FREDERICK FUNSTON	U. S. Army Trans. Corps	Conversion
SS HAWAIIAN CRAFTSMAN	Matson Nav. Co.	Repair & Alterations
SS COMET	U. S. Lines	Recondition Survey
USAT JAMES O'HARA	U. S. Army Trans. Corps	Conversion
USAHS COMFORT	U. S. Army Trans. Corps	Conversion
DREDGE TEXAS	J. M. Allen	Miscl. Repairs
SS HAWAIIAN CITIZEN	Matson Nav. Co.	Repairs & Alterations
SS SILVERMAPLE	Kerr S.S. Co.	Miscl. Repairs
SS GENL. W. H. GORDON	American President Lines	Main Steam Line
SS CAPE STEPHENS	Pillsbury & Matignoni	Drydock & Damage Repairs
SS SANTA JUANA	Grace Line	Renew Heater Tube in Boiler
SS PRESIDENT WILSON	American President Lines	Drydocking & Hull Cleaning

* * * * *

U. S. MERCHANT FLEET AS OF MARCH 1

Table I-U. S. Flag Privately Owned Fleet

	Jan. 1, 1948	March 1, 1948
Total	1,003	1,072
Dry Cargo	643	657
Tanker	360	415

nterior Designs for Uruguay

(Continued from page 91)

Hepplewhite sideboards, Queen Anne chairs and fine ahogany tables were found to be in excellent con- ition at the time of reconversion; the room itself was ot. The designer, therefore, created a restrained modern oom as a background, selected new chair upholstery abrics of blue mohair and designed special drapery abrics of dyed plum with a bold abstract pattern in hite and blue.

The deck is covered with polished breche marble hips with brass inserts. The walls and ceilings are off- hite, while the doors are painted in white with con- rasting plum colored patterns. The principle architec- ural feature of the room is the central illuminated glass eiling which give a feeling of height and openness to e space.

Cabin Class Cocktail Room

The cabin class smoking room located in a separate ouse at the aft end of "A" Deck is an attractive room ith windows on three sides.

It is equipped with a generous island bar faced with added leather. Deep comfortable banquettes, covered ith a nubby sage green fabric, add a bright note of olor. Small cocktail tables flanked by armchairs of ellow-grey wool serge, provide comfortable facilities or card playing and pleasant conversation. The deck is lack rubber, which contrasts pleasantly with the warm rey walls and green ceiling. One of the features of the oom is the specially designed drapery material of beige ith maroon and blue embroidery inspired by the uma and bird motifs of Indian textiles. Furniture is med-oak. A rippled glass screen helps to creat an at- nosphere of coziness, as well as forming a separation rom the bar proper.

Cabin Class Lounge

The cabin class lounge on "B" Deck, unlike the cabin lass dining room, was found to be in excellent con- ition architecturally, but with all furniture and furnish- ngs gone. Here the designer has modernized the back- rounds by the judicious use of color and specially de- igned draperies.

The deck is entirely covered with a grey duratwist arpet; the walls are the deep warm grey-brown of old eather. Blond mahogany furniture provides an interest- ng contrast to the burnt coral, and smoky brown up- olstery materials. The draperies are a natural lines olor with stylized Peruvian bird designs, in shades of rey and black embroidered on them.

The aft bulkhead of the room features a large mir- ored section flanked by mirrored doors to which have een applied jewel enamelled plaques by James Lindsay McCreery.

---

arly San Francisco Shipping

(Continued from page 48)

eam and athwartship crankshaft. An intermediate con- ecting rod from this beam drove the feed pump for e boiler and the circulating pump and the air pump or the condenser.

Side paddles on these vessels were 26 feet in diameter and they operated at 13 to 15 rpm., approximately 1,225 feet per minute surface speed of the paddle wheel, or a ship's speed (allowing no slip) of 12½ knots. Best day's run of the *California* on her run from New York to San Francisco was 285 nautical miles or an average speed of 11.87 knots. In 42 days steaming she averaged 208.33 miles per day, a speed of 8.68 knots. Considerable trouble was had with the salt blowing system of the boilers so that steam pressure was irregular, causing de- lays. Stormy weather, however, was the principal cause of delay with the old side wheelers. Weather that sent the clipper ships roaring along at fourteen to sixteen knots, rolled the paddles out and kept the side wheel steamers floundering and limping along at five to seven knots. Often the paddles would roll six feet clear of the water on one side and be smothered in water on the other causing a tremendous strain on the engines and much vibration and racking strains throughout the hull.

Cabins were fitted to take care of about sixty first class passengers, and standee berths in between deck spaces forward to take care of about one hundred steer- age passengers. The first class cabins had three com- fortable berths, a small settee, a chair, a mirror on the bulkhead and a few hooks for hanging personal effects. Some of these cabins opened into the first class lounge and some on deck. The long room between the port and starboard cabins was used as a dining saloon on the lower deck and as a lounge on the upper deck.

Space on the sponsons forward and aft of the paddle wheels was used for various rooms. Cattle pens and live- stock rooms were usually fitted in these spaces; also barber shops and men's and women's rest rooms. There was but one galley fitted and the rule was two meals a day both in cabin and steerage. Cabin passengers ate at table and were served by waiters. Steerage passengers formed themselves into mess groups of twenty to twenty- four persons and elected a mess captain. This individual secured from the galley hot liquids in one large tin container and hot cooked solid foods in another and dispensed these to the mess group.

In this connection there is an interesting story about the *Oregon*, second steamer to reach Panama and there, like her sister the *California*, finding a great crowd of California-bound gold seekers clamoring for passage. Robertson, her commander, realized that with the extra crowd his galley would be greatly overtaxed. He found two resourceful Americans in the crowd and told them that if they found him a ship's stove and would operate it as cooks, he would give them a free passage to San Francisco. They remembered an old negro who was dis- pensing hot food about half way between Panama and Chagres and they backtracked to his shack, bought his stove for $300 and had it carried by Indian porters down to Panama. They installed it on the forward deck of the *Oregon* partly fastened with wire, rigged a can- vas over it to partially shut off the weather, and dis- pensed hot victuals to the steerage mob all the way to San Francisco.

Those who came in sailing ships were mostly in the so-called "companies," or loose organizations of men who had banded together for the purpose of mining in the California diggings. They would either buy, charter, or build a sailing ship and in many cases work that ship

(Please turn to page 96)

Early San Francisco Shipping

(Continued from page 95)

themselves. Naturally after anywhere from 125 to 300 days at sea, they would be very tired of the ship and on reaching San Francisco would be impatient to get away to the mining districts. So they would sell their surplus goods and sell or abandon their ship and strike out for gold, afoot, on horseback or on a river steamer.

Consequently the bay soon became a forest of masts and ship's hulls, drawn up on the mud flats which became hotels, stores, lodging houses or manufacturing establishments.

As the steamers began to be more regular, "Steamer Day" or Eastern Mail day became a great institution and the growing city turned out en masse to greet the chugging side wheelers as they steamed in under the lee of Clark's Point.

Conditions were very primitive both for the passengers and for voyage repairs and turnaround of the steamers. There were no dry-docks and no machine shops or foundries. However, there was a very large rise and fall of tide in Panama Bay and a convenient sandy beach at Taboga Island. Here the steamers at high tide steamed up on the sand and at low tide they were high and dry. All crews in those were handy men and under the direction of the ship's carpenter they made all ordinary hull repairs while the engine room crew reconditioned engines and boilers.

Late in 1850 Central Wharf was built out south of Clark's Point to water deep enough so that these steamers could tie alongside. A little later the Pacific Mail built machine shops at Panama and shops and a floating dry-dock at Benicia.

All the steamers carried live stock, beef cattle, sheep, and pigs, which was slaughtered by the cook. The staples were hard bread, salt and jerked beef, rice, beans, yams, potatoes, coffee and tea.

Other and smaller steamers made the long trip around through the straits of Magellan and took passengers on at Panama for San Francisco. The captains could practically make their own rates at first. After the service became steady, these rates were \$300 cabin. \$100 steerage. Among these smaller craft were two interesting river steamers, the *McKim* and the *Senator.*

S. S. McKim was a river steamer of 327 tons register. Her owner fitted her out at New Orleans and sailed via Magellan for Panama. Here he picked up 113 passengers at his own rates and arrived in San Francisco October 3, 1849. Shortly after arrival he sold the steamer for \$60,000 to San Francisco interests who put her in the San Francisco-Sacramento run where passengers were waiting in crowds to pay \$30 for the fourteen hour trip with meals extra.

S. S. *Senator* was another shallow draft-side wheeler of 750 tons register and on her arrival on October 27, 1849 she was bought by the same interests and put into the Sacramento river trade alternating with the *McKim.*

Senator, a comfortable carrer and a good earner, was later in the coastwise trade for many years, her last arrival in San Francisco being on May 8, 1882. Her machinery was then removed, and she was rigged as a bark and sold to Oakland interests. By the end of 1851 there were twenty-one steamers operating out of San Francisco on the Sacramento river run. Several of these ships were built in San Francisco Bay shipyards.

The original three steamers of the Pacific Mail Steamship Company had long careers.

S. S. Panama ran regularly in the coastwise route to Panama until 1865. Her machinery was then removed and her hull sold to Central American interests who converted it into a warehouse for the coffee trade.

S. S. Oregon was sold to a San Francisco lumber firm in 1869. They had her machinery removed and her hull rigged as a bark which sailed as a lumber drogher on the Puget Sound-San Francisco run for several years. She was finally wrecked.

S. S. California ran coastwise until her last arrival as a steamer at San Francisco from San Diego November 17, 1875. She was then bark rigged, after removal of machinery, and operated for many years in the coal and lumber trades. She was wrecked on the rocky coast of Peru near Pacasmayo and abandoned as a total loss. Lumber cargo was valued at \$3,000, vessel at \$5,000. All hands were saved.

Oil Tanker Design

(Continued from page 75)

order to contain the subject matter within reasonable limits.

To the Sun Shipbuilding and Dry Dock Company and the Sun Oil Company who have generously permitted the use of statistical and technical data, etc., the author wishes to express his thanks.

The modern tanker is an economical and efficient carrier. Further improvements in design, construction and operation will result from experience gained with present ships, from continued experiment and research and from the application of improved materials and techniques. The tanker field has been so highly developed that it is difficult to foresee the possibility of achieving any phenomenal gains in efficiency or economy; progress is more likely to be reflected as a gain in the range of fractional percentages.

BOOK REVIEW

CORROSION HANDBOOK, edited by Herbert H. Uhlig; published by John Wiley & Sons. Price \$12.00; 1221 pages; 5¾"x9".

A comprehensive new reference work of major importance to chemists, metallurgists, and engineers, this book was prepared under the auspices of the Electrochemical Society and the Society's Corrosion Division, and incorporates the work of 102 leading scientists and engineers. The editor, Herbert Uhlig, is Associate Professor of Metallurgy at the Massachusetts Institute of Technology.

The book provides a condensed summary of information covering all phases of corrosion, including a cross-section of scientific data and industrial experience. The main emphasis is on corrosion prevention and the behavior of metals and alloys in various environments and at both ordinary and extreme temperatures. The importance attached to the practical aspects and applications of quantitative knowledge rather than qualitative is stressed.

MARKEY

Tug "ALERT" Operating in San Francisco Harbor.

Type TMSF Towing Winch

A TOWING TIP

"Experience and Know How" were the answers when we inquired into the phenomenal rise in popularity of Markey Towing Machines in the Bay Area. "We find it more economical to use wire rope, especially for harbor work. We save plenty in material, manpower, and over-all operation."

There's a tip in that for you. Be wise — investigate the Markey Towing Machines . . . Cut operating costs . . . Enjoy the benefits of great flexibility and absolute dependability.

Write for descriptive literature, without obligation, giving any information that will enable our engineers to give you the full benefit of Markey's sea-tested experience.

Towing Machines • Capstans • Windlasses
Hoists • Winches • Steering Engines

Represented by
Geo. E. Swett & Co., San Francisco
J. H. Menge Sales Co., New Orleans

"Let's keep our Merchant Marine —
Uncle Sam's Best Prosperity Insurance."

MARKEY
Machinery Company Inc.
SEATTLE, WASHINGTON

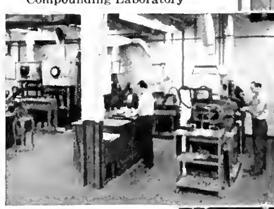
Testing Laboratories general view

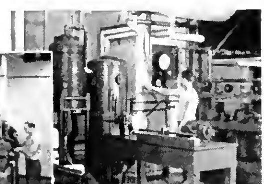
Research

Starting in 1887 with the fundamental question – "what makes packing pack?"—Garlock has extended its research from year to year until the newly constructed building shown above is now required to house Garlock's research activities. Garlock products are developed, improved and refined in these completely modern chemical, physical and rubber-compounding laboratories; thoroughly tested in the fully equipped test department and processed in the pilot plant before ever reaching the production department. This *Quality Control* is your assurance of uniformly high quality in every product sold under the Garlock name.

THE GARLOCK PACKING CO., PALMYRA, N. Y.
San Francisco • Los Angeles • Seattle • Portland

Compounding Laboratory





Another section of Testing Laboratories

Chemical Laboratory

GARLOCK

Ship Structure Materials

(Continued from page 54)

giving satisfactory service.

Alcoa Steamship Company's three new combination vessels "Alcoa Cavalier," "Alcoa Clipper" and "Alcoa Corsair," converted Victory Ships, were also placed in service early in 1947. The former has been placed on the New York-Caribbean route, and the latter on Alcoa Steamship's New Orleans-Carribbean run. These vessels are equipped with aluminum alloy structures above the sun deck, including houses, bridges and smokestack enclosures. Each ship utilizes 27 tons of aluminum in these installations for a total of 55 tons each, including lifeboats, davits, boat winches, airports, bridge and promenade enclosure windows, joiner bulkheads, doors, interior decorations, handrails and hatch covers. All of these installations are reported to be giving excellent service.

Currently building or converting on the West Coast are five large passenger vessels with extensive aluminum alloy superstructures, houses and equipment. American President Lines passenger ship, *President Cleveland,* was completed at Bethlehem-Alameda Shipyard, Alameda, California, late last year and has been placed in the West Coast-Orient service. The *Cleveland* and her sister ship, *President Wilson,* are equipped with two deck midship houses, bridges and twin smokestack enclosures, utilizing about 50 tons of structural aluminum alloys. Together with such equipment as aluminum lifeboats, davits, winches and fittings, including airports and windows, they utilize approximately 125 tons of aluminum. Performance of exposed aluminum installations in these vessels is awaited with considerable interest since careful laboratory and field testing work has been carried out in connection with their design and construction.

Matson Navigation Company's passenger liner *Lurline* has been equipped with aluminum deckhouses in her extensive reconditioning by United Engineering Com-

Ship Structure Materials

pany at Alameda and San Francisco. Moreover, the joiner bulkheads in the elaborate passenger accommodations will be aluminum-faced. The Grace Line passenger ships *Santa Rosa* and *Santa Paula*, placed in South American service early in 1947, are also equipped with aluminum-faced joiner bulkheads throughout the passenger accommodations.

Two Great Lakes motor ships, the *Redfern* and *Redriver*, have been equipped with aluminum alloy poop, bridge and smokestack structures. *Redfern's* installation was completed in 1946 and *Redriver* was finished last year. The two bulk carriers, owned and operated by North American Transports, Ltd. are presently in service between the Lakes through the St. Lawrence river and canals to the Gulf. Use of aluminum in these applications has enabled them to carry additional deadweight through these restricted waterways of the original fall load draft.

Other marine aluminum construction being carried out in Canada today includes the building of 9 river vessels for freight and passenger service. They will be owned by the Ming Sung Industrial Co., Ltd., Shanghai, China, and will be operated on the Yangtze River. Three of these vessels are 270 ft. long B. P. and are building at the George T. Davie & Sons, Ltd., yard at Lauzon, Quebec. The other six are 160 ft. long B. P. Four are building at the St. Lawrence Metal and Marine Works, Ltd., in Quebec City and two at the Davie yard. All will have complete aluminum alloy superstructures, bridges and smokestacks, together with aluminum lifeboats, joined bulkheads and other equipment.

Since the war, plans for two aluminum hulled ore carriers have been prepared and construction of one of them is contemplated. These vessels were designed for Alcoa Steamship Company and will be used for the transfer of bauxite ore from mines located upstream on two of the rivers in Surinam, S. A. One of the proposed vessels will be 400 ft. long B. P. with a 60 ft. beam and 28 ft. depth. She will displace 10,280 tons, have a carrying capacity of 8,400 tons deadweight, be powered by an oil-fueled steam turbine and cruise at 12 knots. The other will be 330 ft. B. P. with a 56 ft. beam and 27 ft. depth. She will have a displacement of 6,800 tons, a deadweight capacity of 5,400 tons, and use diesel propulsion at an estimated 12 knots cruising speed. Both vessels have been approved for special survey and classification by the American Bureau of Shipping.

Because of these recent installations and proposals current interest in marine uses of aluminum alloys is high, both in the United States and abroad. It has been part of the purpose of this article to place these aluminum installations in their true historic perspective with regard to the introduction of new ship structure materials as they have been developed over the past century. Aluminum, like other metals, has had to furnish proof of its technical and economic advantages prior to general acceptance by shipbuilders. In this respect information covering the development of specific alloys and some of the practices for aluminum shipbuilding, exhaustive and perennial laboratory and field testing referred to herein, and brief resumes of the naval and merchant ship installations made to date and tested in service, should be of value in assessing the advantages of aluminum in ship structures.

Use of topside aluminum applications to improve stability, reduce

(Please turn to page 104)

GENERAL SIMON B. BUCKNER

(Continued from page 38)

as a chapel for the daily religious services held on all Army Transports. In the evening this space is used for showing the ship's movies. Also on "A" Deck is the latest surgical, X-ray and laboratory facilities. The bed space is broken down into small, semi-private rooms. Another feature of the hospital is the three baby nurseries, one for isolation cases, one for general medical cases and one known as the "well baby" ward. The latter is used in the event that a mother becomes hospitalized. The baby is immediately placed in the "well baby" ward until such time as the mother is well enough to care for it again. All cribs in the baby wards are removable so that the space may be converted into adult hospital area if needed.

"C" Deck is the troop deck, with accommodations for 1,242 enlisted personnel. The troops are berthed in various dormitory spaces with adequate area which includes increased space for the stowage of luggage. In addition to the berthing space, there is a troop recreation area on "C" Deck and a troop mess on "B" Deck.

Two noteworthy structural alterations have been made to the ship, the first being the filling-in of the well deck forward between the amidship bridge and the forecastle, and the second being the addition of two new pairs of kingposts, one pair forward and one pair aft.

The extension of the Boat Deck forward to the Forecastle Head presented an unusual problem due to the fact that when the ship's lines were originally laid down, no attempt had been made to fair in the line of the forecastle with the amidship bridge as this was not necessary when the structures were widely separated by open deck. The knuckle at the Main Deck in way of the bridge did not appear in the forecastle, hence had to be carried forward with the new structure until it could vanish imperceptibly into the flare of the bows. The difference in deck height between forecastle and amidship bridge necessitated a step-down to the Forecastle Head which is, however, concealed behind the bulwark rail. It is impossible to fair these deck lines together in profile without a double reverse curve appearing. The rather lean look to the foredeck is also the result of the lack of relationship between the lines of the two-deck superstructures involved, which, although inconsequential in the original design, posed an interesting problem which required much deliberation to produce a fair and shipshape result.

The additional kingposts were added between Hatches Numbers 1 and 2 and Numbers 8 and 9. When the vessel was constructed, these hatches were not provided with any cargo gear of any kind. The Army has converted the holds at these compartments into stores and cargo spaces and has furnished them with cargo gear complete with five ton booms, separate winches, etc. New independent topping lift winches were installed on all kingposts, both old and new, to facilitate the operation of topping lifts.

Although purposefully not the equal of trans-Atlantic luxury liners, the vessel affords recreation space for both crew and passengers. Contrary to wartime operation, portlights are provided in all spaces, and besides adding to the passengers' comfort and enjoyment, do much to enhance the appearance of the ship. Although the conversion plans were laid down in New York and the work was accomplished at an Eastern shipyard, the *General Simon B. Buckner* is to be permanently assigned to the San Francisco Port of Embarkation and her red, white, and blue funnels will be a familiar sight in both

(Please turn to page 103)

GRACE LINE

"SANTA FLEET"

SERVES LATIN AMERICAS

S. S. SANTA ADELA
S. S. SANTA JUANA
S. S. SANTA FLAVIA
S. S. SANTA LEONOR

These C-2 fast freight vessels, equipped with refrigerator space, and limited passenger accommodations, together with modern chartered tonnage, supply frequent service between —

BRITISH COLUMBIA — WASHINGTON — OREGON — CALIFORNIA

and

Mexico — Central America — Panama — Colombia — Ecuador — Peru — Bolivia — Chile

SEATTLE	SAN FRANCISCO	LOS ANGELES
White Building	2 Pine Street	523 W. Sixth
SEneca 4300	SUtter 1-3800	MIchigan 7811

VANCOUVER	PORTLAND
991 Hastings St., W.	738 Mead Bldg.
PAcific 7271	CApitol 1013

Canvas PRODUCTS

For *every* purpose

Specialists in Marine Canvas for a quarter century.

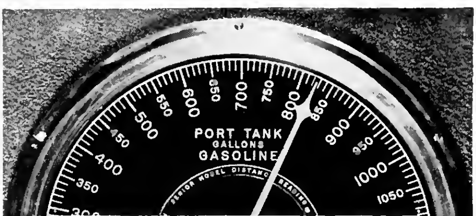
Life Boat Covers, Canvas Dodgers, Deck Gear Covers.

SULLIVAN
AWNING COMPANY

Call C. "Flags" Bennett, MIssion 7-3085

Courtesy purchase privileges on garden furniture and camping equipment

SULLIVAN *Canvas Products* INDUSTRIAL AND MARINE
AWNING COMPANY
801 SOUTH VAN NESS AVENUE · SAN FRANCISCO 10, CALIF. · MISSION 7-3085



FUEL AND WATER LEVEL INDICATION

at a Glance

WITH A LIQUIDOMETER DIAL TYPE TANK GAUGE

Direct Reading • Remote Reading

HYDRAULIC, HYDROSTATIC OR ELECTRIC TRANSMISSION

•

For complete information, prices and delivery dates, write or phone

THE LIQUIDOMETER CORP.
Marine Division

41-52 37th ST., LONG ISLAND CITY 1, N. Y.
STillwell 4-1440

PUGET SOUND BRIDGE & DREDGING COMPANY

SINCE 1889

Shipyard Division

SHIP REPAIRING AND CONSTRUCTION
COMPLETE FACILITIES
DRYDOCK AND GRAVING DOCKS
1500 FT. DOCKAGE, WHIRLEY CRANES
AND ALLIED SHOPS

STEEL FABRICATORS AND ERECTORS
GENERAL CONTRACTORS

ELiot 2072

2929 - 16th Ave. S.W. — **Seattle 4, Wash.**

LET US BE YOUR PACIFIC NORTHWEST REPRESENTATIVE

for

YOUR PHOTOGRAPHIC PROBLEMS

From land, sea or air
over 8000 ship photos in our files

WILLIAMSONS'
MARINE SALON PHOTO SHOP

81-A Marion St. Viaduct, Seattle, Wash.
ELiot 3533

;eneral Simon B. Buckner

(Continued from page 101)

ian Francisco and Seattle. Her first scheduled run into ian Francisco is set up for May 31, 1948 when this ueen of the transport fleet steams under the Golden ;ate Bridge to be acclaimed by her followers in her iome port.

The *President Cleveland* of American President Lines ; also of the P-2 type, and was built at the same West ;oast yard—Bethlehem-Alameda.

IERCHANT MARINE

(Continued from page 40)

or many people when they think of the future of the merican Merchant Marine. It should be borne in mind hat only a small portion of them—710 long range types nd 115 emergency types—are considered suitable for ncorporation in the postwar fleet. The American Merhant Marine could not possibly utilize the vast amount f tonnage left over from the war. In the first place, most f the vessels are not suitable for competitive operation, nd in the second place, a fleet built within a space of ve years will become obsolete all at once in the same pace of time.

If we are to build a postwar Merchant Marine adequate or both trade and defense we must remove the mental azard of the war-built fleet. The only sensible thing to o is to take from it the ships we can use and go into new onstruction to provide ourselves with new vessels on a onstant year-by-year replacement schedule. This will nsure that we will always have a modern fleet, that its hips will become obsolete and be replaced gradually intead of at one time, and that our shipyard workers will e given steady employment at a level which will keep ufficient numbers of them at their trades.

Meanwhile, for a good many years to come, the waruilt fleet will continue to serve us. We have already old 1,750 of these vessels for a return of $1,700,000,000 o the United States Treasury. We have placed over ,400 more of them in the reserve fleets. There they will e protected and kept in readiness to be brought out and nobilized into service in case of an emergency.

On May 22 the American people will again observe National Maritime Day, a day dedicated to the American Merchant Marine and what it has meant to this country rom colonial times to the present, through peace and var. The Merchant Marine stands ready to serve us in he postwar period as it has in the past. It deserves the upport of everyone in its efforts to keep our flag on the eas as a symbol of democracy throughout the world.

oot Blowers

eed Cleaning,

00

. L. (Bob) Dill, wellnown along the San rancisco water front, ows one of the Diaond Soot Blowers at he will service fter its long operaon in blowing a boiler of soot.

Ship Structure Materials

(Continued from page 99)

stress in superstructures, and to reduce or eliminate magnetic disturbances in the vicinity of magnetic compasses, have received wide acceptance by builders and operators. When used in large amounts, such light metal installations can aid materially in providing greater deadweight carrying capacity or in increasing speed without added power. Large scale application of aluminum would permit equal speed with less power and reduced fuel consumption and costs. An all-aluminum hull would ultimately double these advantages in certain types of commercial vessels. Since aluminum's corrosion rate is negligible, it should be possible to adjust scantlings to equitably compare with the corrosion factor for steel, thereby reducing maintenance costs. Non-sparking characteristics of aluminum are of particular importance to the safety of water-borne oil carriers and the metal's high reflectivity for reducing evaporation losses is a significant economic advantage. In fishing vessels, the high resistance of aluminum to corrosion presents attractive possibilities.

Over the ages of development of ships and shipping, man has used a progressing number of new materials to express his thoughts. He no longer uses baked clay or stone or bark for hieroglyphic expression. New ideas are still made possible, not merely by presenting them on parchment or laying them down on paper, but because some individual or group of individuals adapts methods and materials untried in a particular field to effect economies and increase profits. The whole development of merchant shipbuilding has thus advanced through striving after the economical means to carry more cargo or passengers more cheaply and safely. Aluminum has its own economic advantages to foster those purposes, and it is inevitable that the future will see more ship owners and operators adopting more aluminum for shipbuilding.

Nat Levy Retires

Nat Levy

The resignation of Nat Levy as vice president and secretary of the Moore Dry Dock Company was announced recently. Levy asked to be relieved of his duties after 42 years of continuous service with the Moore family.

He started as an office boy in the Risdon Iron Works in 1905, and during his years with the Moore Company he served through two world wars when the firm was called on to build hundreds of ships for the U. S. Government.

High tribute was paid to Mr. Levy by Joseph A. Moore, president of the firm, who gave much of the credit to Levy for the tremendous shipbuilding and repairing programs that were successfully carried on by the Moore Company during World Wars I and II.

Well known throughout the Bay area, Levy is president of the Oakland Board of Park Directors and is a member of many organizations and clubs in the San Francisco Bay district.

FUEL OIL DOLLARS

(Continued from page 73)

analysis again indicates ferric sulphide. (Fig. 7.)

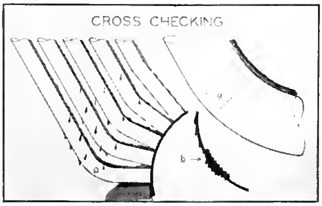


Fig. 7

I have had my share of entering a hot combustion chamber in the early hours of the morning to roll tubes in the back end of an H.R.T. boiler. I have heard the tubes crackle and have seen the pieces of broken beads fall away. I have done more. I have taken the pieces to the lab and found them to be compounds of sulphur.

The back end of an H.R.T. boiler is usually the lower end, to permit proper draining. Sulphuric acid also runs downhill and drips from bead to bead. It is observed that the front end of this type boiler is almost always in much better condition than the back end. (Fig. 8.) Having described the reaction of sulphur in other boilers, it is hardly necessary to enlarge on the troubles encountered on the lower ends of a Wicks type boiler. (Fig. 9.)

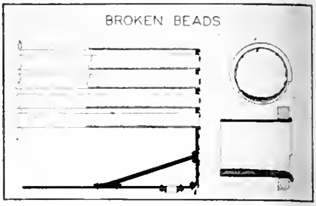


Fig. 8

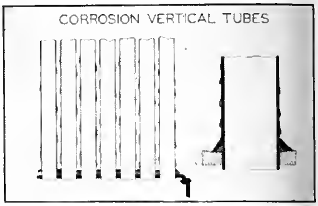


Fig. 9

Troubles due to collection of sulphur deposits generally show up in four particular positions on the fire side of a boiler. Unfortunately, if the tube fails, the water side of the boiler usually gets the blame, for the real evidence is always blown away when the tube fractures. The more common positions are as follows: At the end of horizontal baffles. Between the tubes on vertical baffles. Between side tubes and side walls and at tube ends on top of lower drum. Coincidentally, all of these positions are difficult to reach with soot blowers. (Fig. 10.)

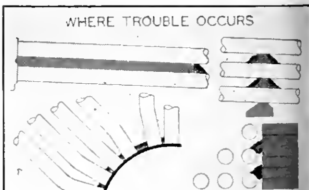
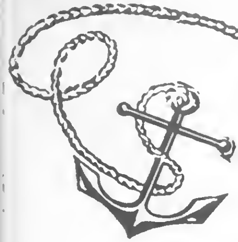


Fig. 10

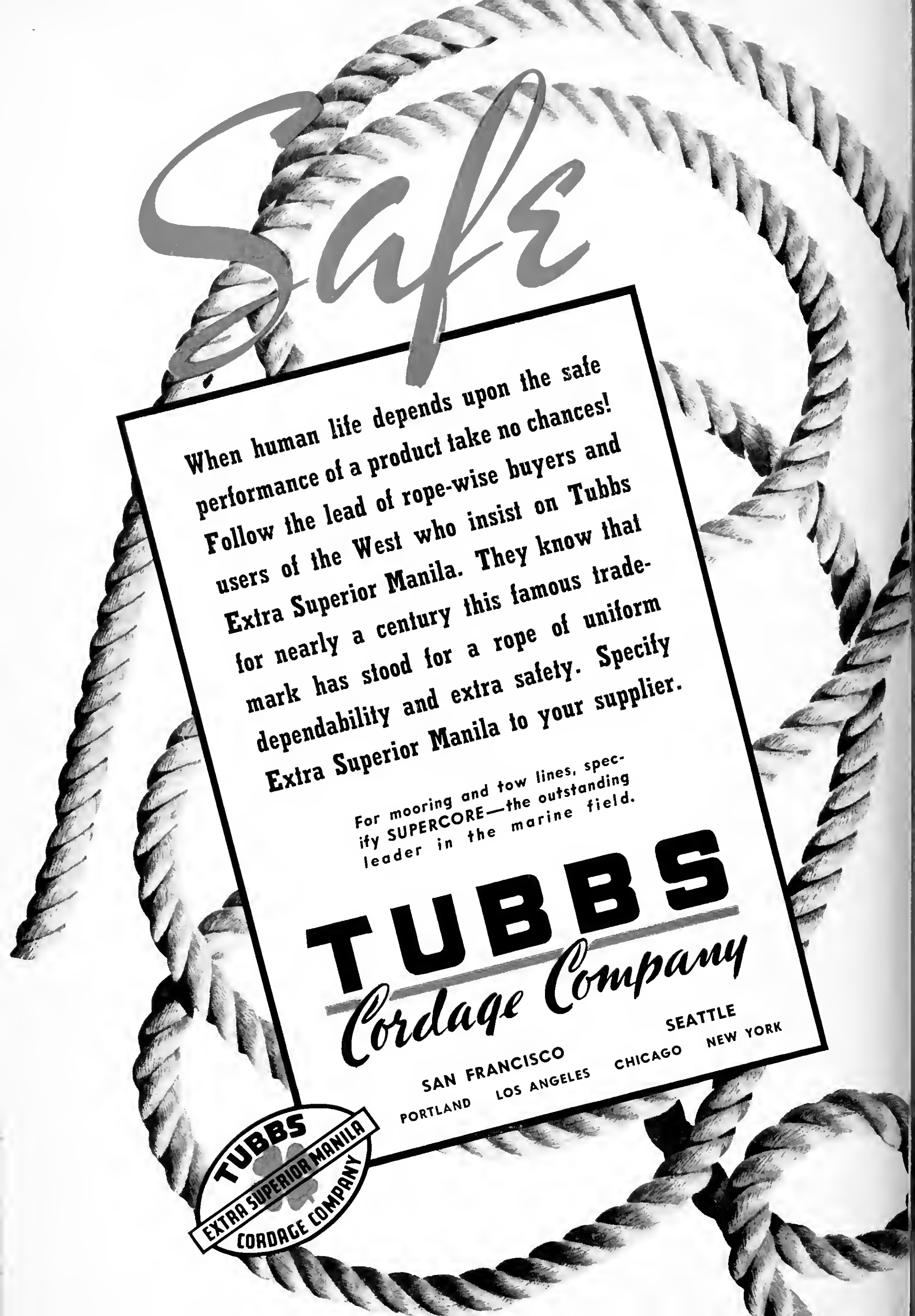
With regard to combustion deposits, I think we recognize beyond all question of doubt, that instead of being a soot problem, ours is a sulphur problem and it should be treated accordingly. During an early experience as a test engineer on metal, I developed a compound long known the world over as Gamlenite Metal Replacement. In chemical jargon "Metal Replacement" means "reduction" or "replacement." It refers to the electromotive power of one metal over another. By the process of replacement we can release sulphur from its compounds, and thereby control the formation of combustion deposit. When we control the sulphur accumulation and formation, we control the entire deposit problem.

There is not much collective security in a flock of sheep on the way to the butcher.—WINSTON CURCHILL.



Pacific MARINE REVIEW

MAY 1948


Safe
When human life depends upon the safe performance of a product take no chances! Follow the lead of rope-wise buyers and users of the West who insist on Tubbs Extra Superior Manila. They know that for nearly a century this famous trade-mark has stood for a rope of uniform dependability and extra safety. Specify Extra Superior Manila to your supplier.
For mooring and tow lines, specify SUPERCORE—the outstanding leader in the marine field.
TUBBS
Cordage Company
SAN FRANCISCO
SEATTLE
PORTLAND
LOS ANGELES
CHICAGO
NEW YORK
TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY

Pacific MARINE REVIEW

.. HINES
Publisher

.. DeROCHIE
Assistant Publisher

..DOUGLAS MacMULLEN
Editor

.. DeROCHIE, Jr.
Assistant Manager

..UL FAULKNER
Pacific Coast Advertising Mgr.

..VID J. DeROCHIE
Assistant Los Angeles

..ORGE W. FREIBERGER
Advertising Mgr. San Francisco

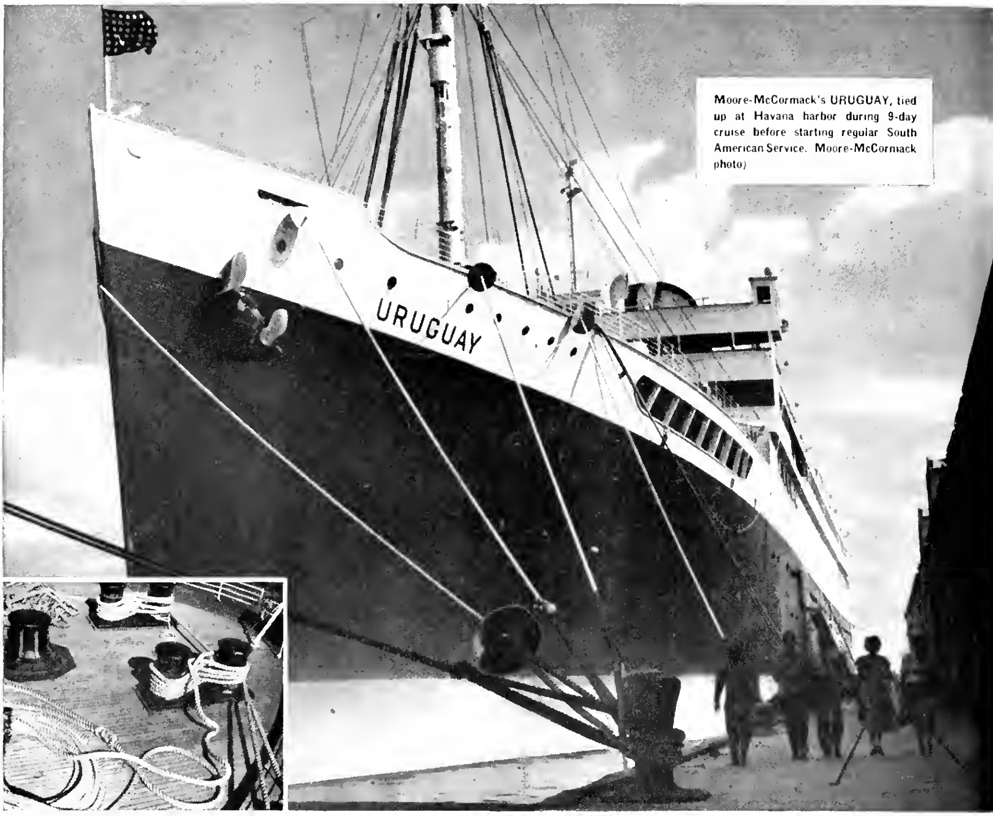
..S ANGELES OFFICE
..Wilshire Blvd., Beverly Hills
..phone—BRadshaw 2-6205

SAN FRANCISCO
..lephone—GArfield 1-4760

Member Audit Bureau of Circulations

S..scription rates:
O.. year, $2.00; two years, $3..; three years, $5.00; for..., $1.00 additional per year; si..e copies, 25c.

TABLE OF CONTENTS - - - - - - - MAY, 1948



Moore-McCormack's URUGUAY, tied up at Havana harbor during 9-day cruise before starting regular South American Service. (Moore-McCormack photo)

Stern deck of the URUGUAY, showing Columbian Tape-Marked Pure Manila Rope. (Moore-McCormack photo)

The URUGUAY Returns To South American Service

Moore-McCormack "GOOD NEIGHBOR" Liner, Converted from Military Duty, Rigged with COLUMBIAN ROPE.

Connecting New York with Rio de Janeiro, Santos, Montevideo, and Buenos Aires, the Moore-McCormack vessel URUGUAY re-entered passenger service in February, this year. In drydock 16 months refitting from troop transport duty during the war, this unit of the "Good Neighbor" fleet has passenger capacity of 477, cabin and first class, as compared with pre-war accommodations for 432.

The 33,000-ton, 18½-knot URUGUAY was first commissioned in 1938 for the South American run in luxury passenger and cargo movement. Her war record began March, 1942 and ended June, 1946, with service in Atlantic and Pacific theatres. Reconversion was at the Federal Shipbuilding yard in Kearny, N. J.

Passenger quarters and public rooms provide an interesting combination of pre-war design and equipment with post-war materials and color treatment.

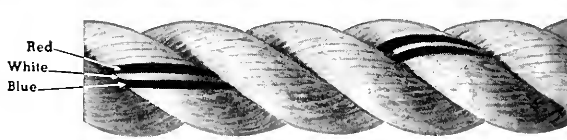
Power and navigational equipment is, of course, top grade throughout. For rigging . . . COLUMBIAN—The Rope of the Nation.

COLUMBIAN ROPE COMPANY

400-90 Genesee St., Auburn, "THE CORDAGE CITY," N. Y.

Columbian

TAPE MARKED PURE MANILA ROPE



Pacific Marine Review

THE WEICHEL BILL

IF THE MERCHANT MARINE ACT OF 1936 was a Magna Charta, the Weichel Bill (if enacted) may be regarded as a Bill of Rights for the shipping industry. In place of the constant struggle for small but needed concessions from 102 government agencies, this bill and an earlier one by the same author would establish basic procedures and rights. We hail Congressman Alvin F. Weichel for going to bat for the entire 11-point long-range program urged by the National Federation of American Shipping, of which the Pacific American Steamship Association is an important part. In fact, the Pacific American was instrumental in preparing the program.

True, the mere establishment of "rights" does not assure wise management, nor adequate traffic, nor lessened competition, nor freedom from labor stoppages. But a chance to operate fairly is all that the able leadership of the maritime industry asks, or could reasonably ask. The economic conditions which will be created under the Weichel Bill (there are really two bills and Senator White has introduced companion bills in the Senate,) will benefit all operators "across the board" and permit operation of the steamship business on sound principles.

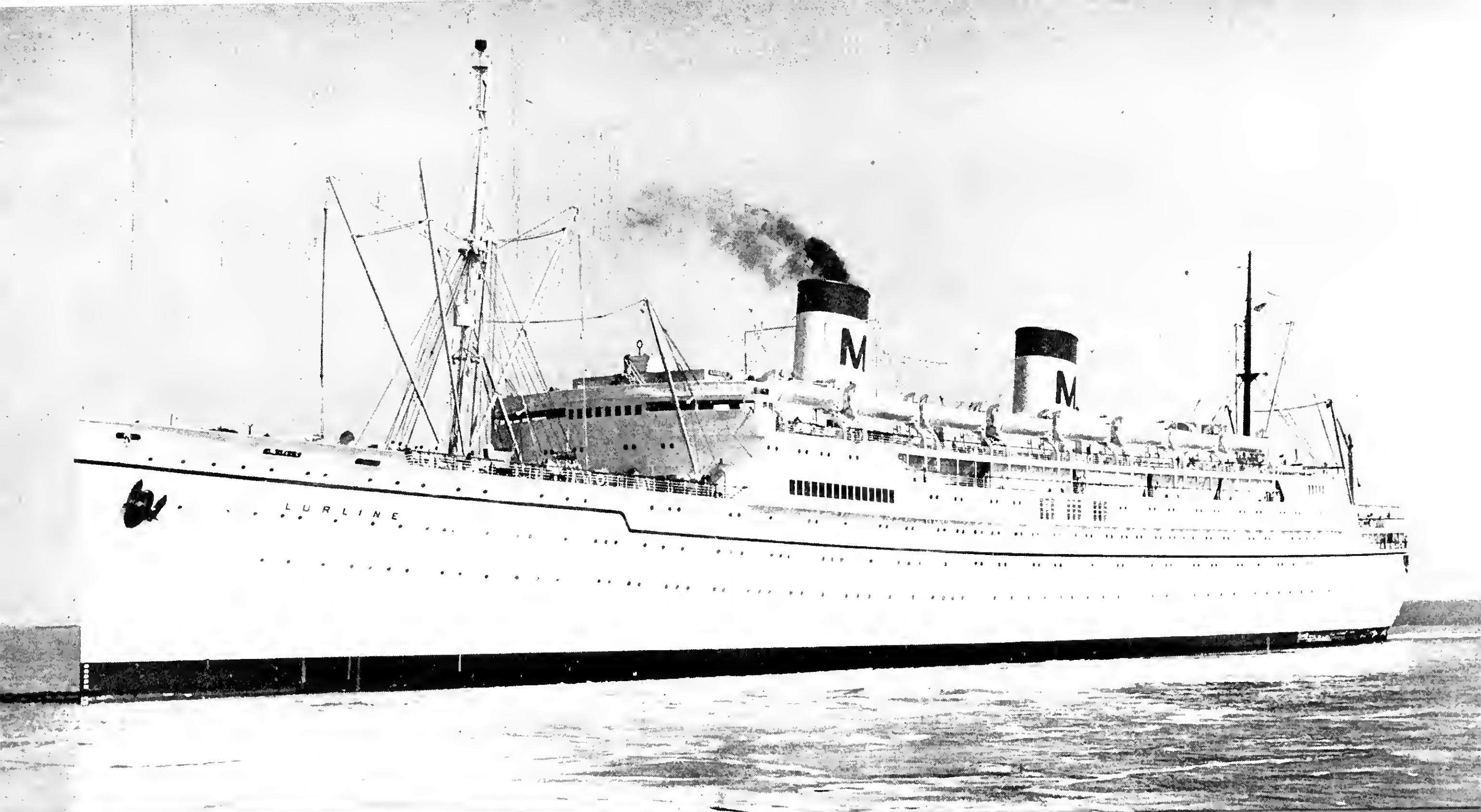
President Frazer Bailey of the National Federation and President Albert Gatov of Pacific American analyze the Weichel provisions as authorizing construction subsidies for domestic shipping as well as for offshore, and for an accelerated rate of depreciation for tax purposes; also that construction subsidies be fixed at 50 per cent for all vessels, both domestic and foreign, and that each passenger vessel may be regarded as a separate operating unit for subsidy and liability purposes. This to be accomplished by multiple corporate setups.

The Bill provides that the Government pay for all national defense features in vessels, including excess speed for military purposes, and other installations in excess of requirements for similar features on competing foreign ships. Incentive for building modern vessels is provided, among other things, by liberalizing trade-in allowance, and permitting turn-in of vessels over twelve years of age. Interest rates on deferred payments must not exceed the cost of such money to the government.

A big item for the intercoastal and coastwise services is in making it unlawful for the Interstate Commerce Commission to permit discriminatory and non-compensatory rates by land carriers in competition with water traffic.

The mere introduction of this legislation is a tribute to the business statesmen now leading the industry, and should be hailed especially in the port cities, where shipping is a major element in the community income.

Next: Free Panama Canal passage.



The New Lurline

The New Lurline

CONSIDERED TO BE the world's most beautiful ship, Matson's new *Lurline* sailed from San Francisco to Honolulu on April 15 on a triumphal maiden voyage. In advance of the trip all tests were fully met, and in accommodations and travel comfort the ship has everything.

PRINCIPAL CHARACTERISTICS	
Length Overall	632'0"
Length Waterline	628'0"
Length B. P.	605'0"
Beam Molded	79'0"
Depth Molded C. Deck	52'9"
Draft Molded	28'0"
Displacement of Draft	26000 tons
Gross Measurement	18500 tons
Net Measurement	10580 tons
Normal Shaft hp	22000
Sea Service Speed	20.5 knots
Maximum Speed	22.5 knots

John E. Cushing President, Matson Navigation Company.

Machinery Installation

The machinery consists of high pressure, high temperature, water tube boilers by Babcock and Wilcox, and single reduction geared turbines and electric auxiliaries. It is a twin-screw installation, designed to deliver 22,000 total shaft horsepower at 124 revolutions per minute of the propellers in normal operation. The turbines were built at Bethlehem's Fore River plant where Morris Weitzner, now chief engineer of Bethlehem's San Francisco yard, had a major part in the designing.

In the $19,000,000 job just completed at Matson's United Engineering and Drydock Company plant at Alameda, California, the *Lurline* has been turned out as a new ship. Past issues of the *Pacific Marine Review* have described the major construction features in detail, leaving for this article the developments of present public interest. These include the interior and public room arrangements, refrigeration and air conditioning, fresh water supply, electronic equipment, cargo handling, and —special pride of the Matson management—the crew accommodations.

Interiors and Public Rooms

All the passenger facilities, lanais, staterooms and public rooms were planned by Raymond Loewy, of New York, one of Americas foremost industrial designers.

The ship is completely air-conditioned—public rooms, staterooms and crew quarters. Passengers, through individual control units in each stateroom, can raise or lower the temperature of conditioned air to suit their individual taste.

The *Lurline* will accommodate 722 passengers—484 in first class and 238 in cabin class. A crew of 444, or more than one crew member for every two passengers, is required to maintain Matson standards on the new vessel.

Every first class stateroom is equipped with private bath and toilet. In the majority of staterooms the bath facility is a shower although some have both tub and shower. In the majority of instances the bath and toilet facilities are contained in separate compartments with each compartment equipped with washstand and mirror.

The shopping center, library and writing room, gallery, main lounge, large "H" shaped smoking room, which is actually four rooms in one, and the veranda are all on A deck.

The main or first class lounge is one of the largest rooms on the ship. It has a stage concealed by handwoven drapes, antique gold mirrored walls, ceiling-height windows, covered by mahogany carved scrollwork screens, and furnishings which achieve a harmonious blending of soft pastels. It is a room of many moods, a theater at night when the latest movies are shown, a concert room during afternoon tea and a rendezvous at other times.

The first class smoking room is divided into four functional sections, each one individually designed. On the port side forward is the club room and on the starboard

STATEROOMS ON LURLINE

1. Stateroom as it appears by day.
2. One of the three-berth cabins is shown here as a daytime living room.
3. One of the first class staterooms in the "living-room-by-day" arrangement.
4. One of the three-berth cabin class staterooms seen with the beds ready for occupancy. In the daytime two of the beds disappear and the third is converted into a full length sofa.
5. A "Lanai Bedroom" consisting of bedroom, sitting room and bath.
6. Three-berth cabin class stateroom seen with the beds ready for occupancy.
7. A "Lanai Suite." There are six of these suites aboard the Lurline, each one comprising dressing room, bedroom, lanai (or porch) and separate bath and toilet compartment.


1


2


3


4


5


6


7

PUBLIC ROOMS ON LURLINE

1. First class writing room-library.
2. First class dining room showing the huge mosai Ulysses and the Sirens.''
3 The first class lounge.
4. The cabin class dining room.
5 The Veranda. During morning hours the dance floor serves as a race track for miniature ponies; in mid-afternoon for games, and at night a night club
6. The first class smoking room showing one of two large murals.
7. The card room.


1


2


3


4


5


6


7




side the card room. The bar forms the cross-bar of this "H" shaped room and sweeps in curved wall seats to the aft portside section of the smoking room. The starboard aft side alcove is another area for diversions of the ship's smoking room.

The new ship has its own tailor shop, laundry, barber shop, beauty salon, printing shop, carpenter shop, a complete shopping center and a modern night club with spacious dance floor. She has two sports decks, a swimming pool and a wide promenade deck with plenty of room for deck chairs. The *Lurline* has a modern hospital with its own air conditioning system.

The *Lurline* has a 400-line telephone system for passengers and two additional telephone systems for use of her operating personnel.

The main galley of the *Lurline* is all electric, gleaming with eight ranges, pressure cookers, dishwashing machines, ovens and stainless steel working tables. Installed throughout is the most modern equipment available. Each electric toaster, for instance, turns out 750 slices of toast per hour, the potato peeler handles a sack of potatoes in six minutes and the pressure cooker has a capacity of six bushels of vegetables.

Outstanding feature of the construction of the new *Lurline* was the extensive use of Johns-Manville Marinite for walls of all public rooms, staterooms, personnel quarters and similar enclosures. Marinite is a fireproof asbestos type paneling characterized by unusual strength and hardness. Aluminum was used generously in sheathing for walls and in the superstructure. Rubber tiling in new colors and designs cover all inside decks. All the open decks and outside handrails, doors and ladders are teakwook.

On the sun deck forward and on the same deck between the stacks new steel frame houses with aluminum plating provide quarters for the licensed personnel as well as fan rooms for the new air conditioning equipment.

On the B deck level the house extends to the ship's side providing space for passenger accommodations. B deck extends forward over the well deck where are found crew quarters, air conditioning machinery rooms and additional open deck space forward.

The stacks are streamlined with the whistles and whistle platforms recessed in the forward stack.

Lanai Suites and Bedrooms

There are six "Lanai Suites" on the *Lurline,* three on each side of B deck amidships.

The suites are 27 feet long, from the entrance door to the ceiling height Kearfott Fulvu windows overlooking the sea, and 15 feet wide. They include dressing room, bedroom, lanai (or porch) and separate bath and toilet compartments.

The dressing room has a built-in wardrobe and ceiling-high chest of drawers and a vanity. The bedroom contains twin, fixed beds with a bleached oak chest of drawers between, full length mirror and a combination desk and chest of drawers.

An open-work lattice screen separates the bedroom and

From top to bottom:
Shopping center on Lurline.
Main Foyer.
Air-conditioned Elizabeth Arden Salon.
Pictorial tile map mural on walls of main foyer on E deck.

the lanai and accommodates on the lanai side a slanted fixture with recessed top holding luxurious tropical foliage.

The exterior wall surface of the lanai is floor-to-ceiling Kearfott windows through which a panorama of sea and sky can be seen.

By night the lanai is illuminated by indirect lighting and a tall bronzed table lamp of Polynesian design. The entire suite is air conditioned.

Shops and Shopping; Sheets and Napkins

The *Lurline* has its own tailor shop, laundry, carpenter shop, barber shop, beauty parlor, printing shop and a complete shopping center.

The laundry, located on F deck near the middle of the ship, is 48 feet long and runs the full width of the ship. It is a modern laundry fully equipped with the latest washing machines, mangles and ironers and capable of handling all the ship's 17,000 sheets, 36,000 napkins, 86,000 towels, 13,000 pillow cases, 2,350 blankets and other linen.

Soiled linen from the dining saloon is dropped into chutes direct to the laundry and eliminates the necessity of bundling this laundry and carrying it through passageways and other public areas.

The print shop has its own press, type and linotype machine and prints the daily text matter of all shipboard menus, programs, announcements, the daily newspaper and the hundreds of forms used by the operating personnel.

The two-chair barber shop and the beauty salon are both on D deck. The beauty salon has three hair dryers, hair stylist chair, manicurist table and a facial couch.

The shopping center, on A deck, carries cigarettes, perfume, magazines, books, candy and a thousand and one items from hairpins to sports clothes, as well as luxury merchandise, for the convenience of the 722 passengers during the voyage.

Crew Quarters

Each of the 444 men and women manning Matson's new *SS Lurline* will live better than the crew of any liner afloat.

Every comfort and convenience for the crew, and every facility to make work easier was built into the ship.

Old style dormitories will not be found aboard. Instead, the crew live in air-conditioned rooms where the temperature is controlled by a thermostat exactly like the passenger staterooms.

Every effort was made to provide maximum privacy for the men and women working the ship with the result that while a few ratings aboard are grouped six to a room the majority of the unlicensed personnel live in four, three, two and single berth rooms.

Crewmen working the night shifts are all grouped together—on D deck forward, port side—in an area

From top to bottom:

One type of air-conditioned two-berth room for crew members. In the picture the man is dialing the public address outlet for radio and ship's musical programs.

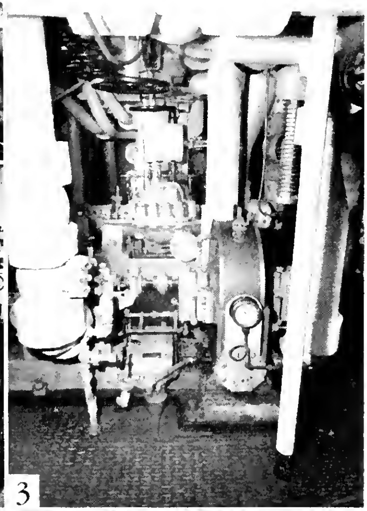
One of the five crew messrooms.

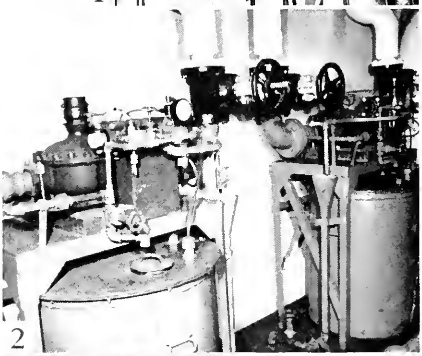
Four-berth room for crew members.

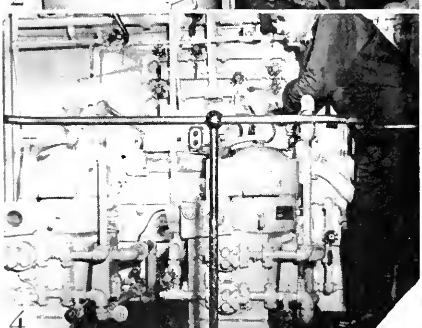
The all-electric, stainless steel galley for the crew. This is a smaller version of the main galley.

1. Insulation on main steam lines in fire room of the Lurline.
2. Wallace and Tiernan Hypochlorinators for water supply purification.
3. In the foreground is shown the Warren Turbine Driven Centrifugal Port Feed Pump and in the background, the Warren Turbine Driven Centrifugal Main Feed Pump.
4. De Laval Separators. Chief Engineer A. E. Nielsen is at the right.
5. Charles Gusukuma, Executive Chef, and Peter Aulbert, Pastry Chef, shown in front of one of six Cat. No. 204P400 Hotpoint Ovens in the Pastry Shop aboard the Lurline.
6. View of main feed pump in engine room of Lurline with extensive piping insulation.
7. Albert Gerz, Chief Steward, and Peter Aulbert, Pastry Chef, kneeling before Cat. No. 133G48 Hotpoint griddle in the Pastry Shop aboard the Lurline.

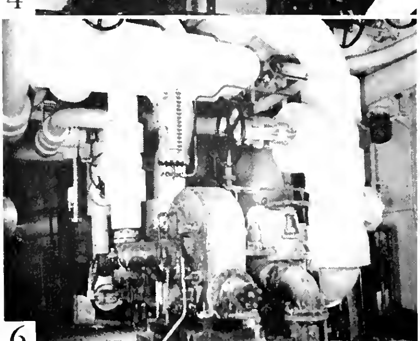

1


3


2


4


5


6


7

1. Griscom Russell Evaporators and Fisher and Porter gauges.

2. Davis Engineering Corp. "Paracoil" Feed Water Heaters. In the picture are Ray Sample, Port Engineer, Matson Navigation Company and First Assistant Engineer Dana T. Johnson

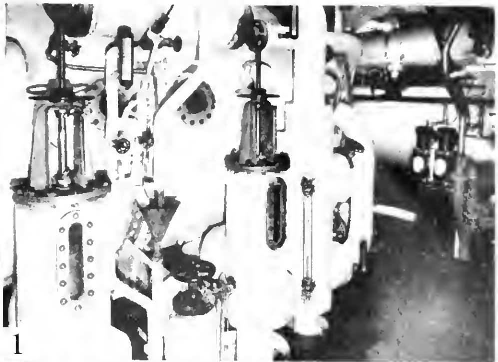
3. Warren Centrifugal Air Conditioning Hot Water Circulating Pumps

4. Griscom-Russell Evaporator.

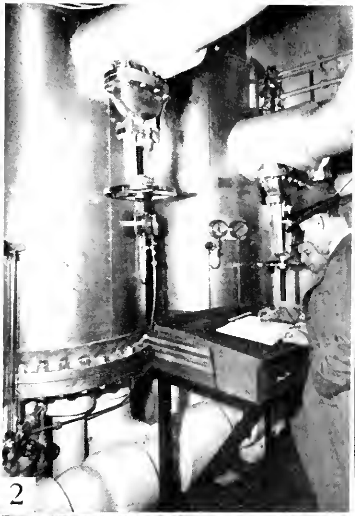
5. Air Conditioning Refrigeration Plant. Two Carrier Centrifugal Water Cooling Units, Steam Turbine Drive

6. Cargo Reefer Plant Four Carrier 7G8 Compressors. Brine pumps are to the right.

7. Warren Pumps servicing the Griscom-Russell Fresh Water evaporator

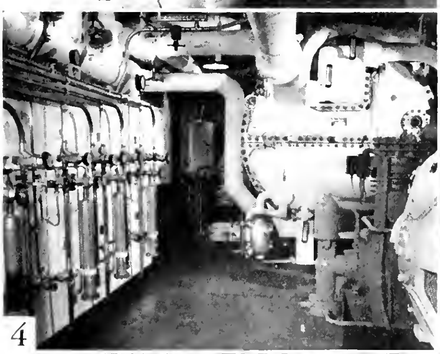


1

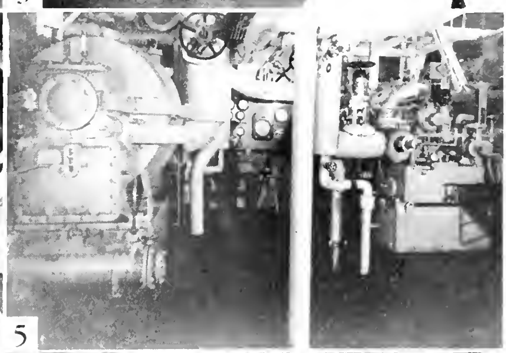


2

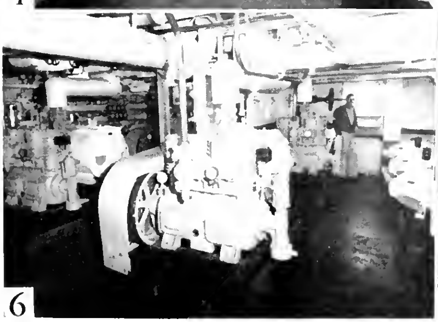
3



4

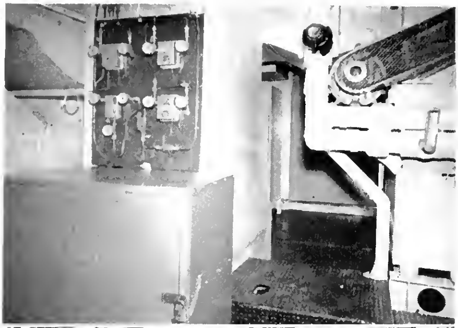


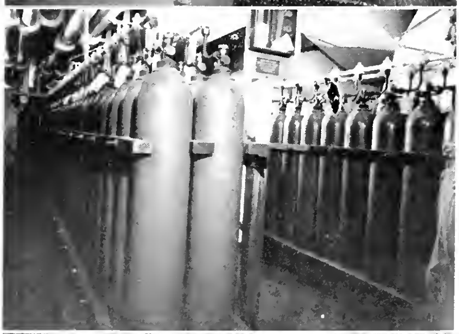
5

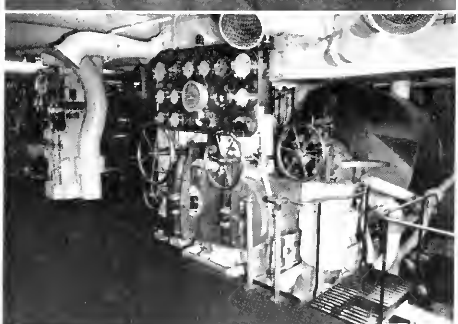


6

7







Top: Typical Fan Room Carrier A/C System. Johnson Controls used extensively on ship.

Center: CO_2 Room. Installation by Hough and Egbe. (Walter Kidde System).

Bottom: Main Engine Room. Control Board, Port Turbines.

where there is maximum quiet.

In addition, deck and engine crewmen working watches are quartered in separate rooms so that their coming and going will not disturb others.

Basic equipment for each room includes full length lockers for each occupant with shelving and an inner compartment with lock for valuables, wash stands, mirrors, individual bed reading lamps, chairs, connections for electric razors and standard 31" by 78¼" beds.

Not only are the rooms air-conditioned but each room has a public address outlet for both radio and musical programs originating aboard ship.

The crew quarters are segregated as to departments—deck, engine and stewards—and each department area has numerous modern shower rooms, wash rooms and toilet rooms. These facilities are all separately grouped, wash basins in one big room, showers in another big room, etc., and more such rooms than are actually needed are provided so that at no time need they be crowded.

Unlicensed personnel have their own barber shop, located on D deck starboard; a deck recreation area, on B deck forward; a "slop chest" on E deck forward where cold drinks, candy, cigarettes, clothing, toilet articles, magazines and other necessities for life aboard ship may be obtained.

A hospital for crew members is on E deck forward. It contains 14 berths, dispensary, modern operating room and shower and bath facilities. A hospital attendant is on duty here at all times.

There are five air-conditioned crew messrooms located on F deck forward. The largest seats 70 and the smallest 16. They all have public address outlets for radio and musical programs. The messrooms are served from a large pantry connected by dumb-waiters to the crew galley on the deck above. The crew galley is a smaller version of the main ship's galley and is all electric and stainless steel. Three drinking fountains are conveniently located at the messrooms.

The paymaster's window, formerly located in the purser's office, is now more conveniently located near the messrooms in the crew area.

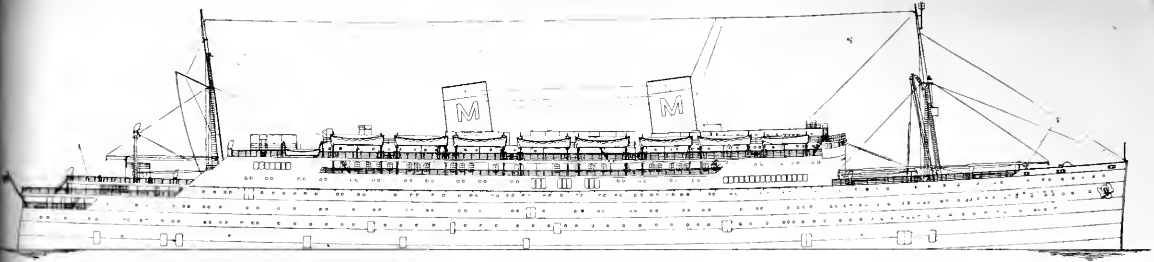
On the five decks, A to E, where passenger staterooms are located, there are a total of 65 stewards' lockers. They contain facilities for stowing linens, silverware, cleaning materials and spare uniform jackets. Lockers on A deck are provided for stowing deck chairs, pads and blankets. Additional lockers are provided on the sun deck, boat deck and in the crew quarters for the convenience of the stewards serving those areas.

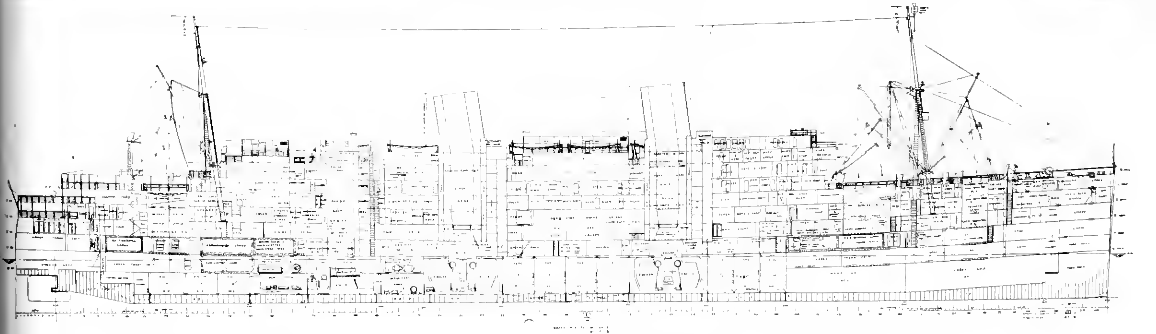
Pantries are located on B, C. and D decks for stewards serving passengers in their rooms. The pantries contain double sinks with thermostatic water temperature control, five-gallon hot water urns, electric toasters, hot plates and refrigerators. There are two pantries on each of these three decks.

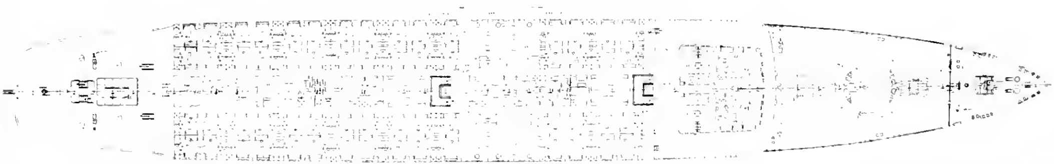
An elevator for stewards' use only runs from the galley on E deck to A deck and enables stewards to bring food from the galley without walking up stairways.

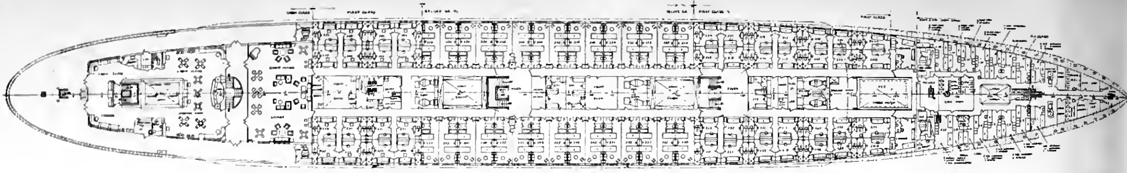
50 Pounds of Caraway Seeds; 32 Kinds of Cheese

When the *Lurline* sailed from San Francisco for Honolulu via Los Angeles on her maiden voyage April 15,

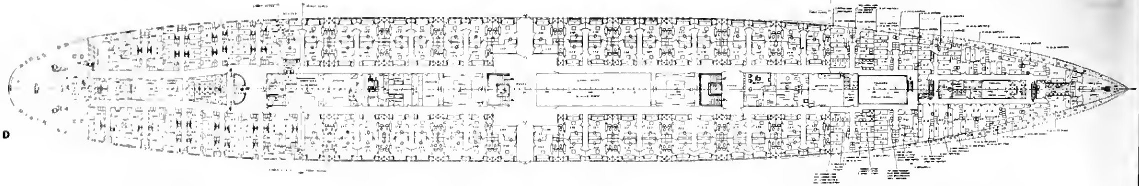




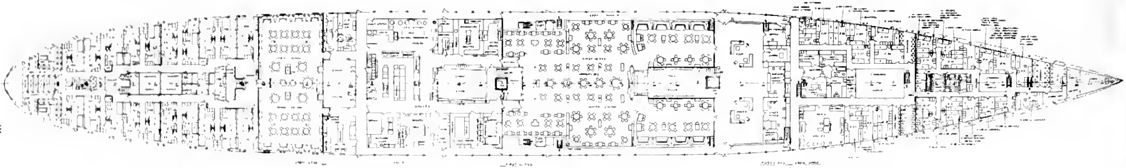


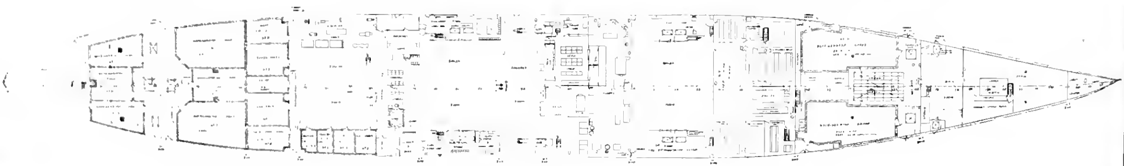


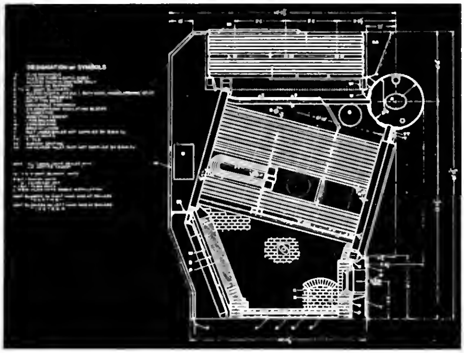
D



E

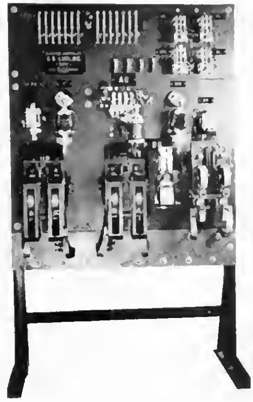






Left, Babcock and Wilcox boiler.

Right, Main control on passenger elevator designed and installed by Atlas Elevator Company.



her larders contained a thousand different items ranging from forty tons of meat to fifty pounds of caraway seeds to appease the sea-whetted appetites of her 722 passengers and 444 crew members.

For instance, the *Lurline* carries forty-one different kinds of fresh fruits; sixty-five different kinds of fresh vegetables, including poi, the Hawaiian staple food made from taro root; twenty-nine assorted varieties of ice cream; twenty-nine choices of fresh fish and thirty-six varieties of canned vegetables—not to mention thirty-two different kinds of cheese.

And The Galley

Occupying the center of the galley are eight Hotpoint electric ranges of the latest type with thermostatically controlled ovens. On the starboard side of this bank of ranges is a deep fat electric fry kettle for French-fried potatoes and other vegetables and at the other end is a similar deep fat fryer for fish. These fryers are also thermostatically controlled.

Directly behind the ranges is the cooks' work table of stainless steel with maple cutting boards at each end. Along the aft bulkhead are the refrigerators used to store foodstuffs brought up from the storeroom below on the freight elevator which opens at the starboard end of the refrigerators.

Turning and then walking forward along the starboard side of the galley you see the butcher shop, the bakery, cold pantry and the coffee pantry.

The butcher shop contains large walk-in refrigerators, automatic meat slicers, grinders, meat and bone cutters and butchers' work table and chopping blocks.

The bakery is equipped with two thermostat controlled electric ovens, electric griddle, trunnion kettle, electric dough mixters with four speeds, dough dividers and bread proofer, as well as work tables and a refrigerator for ice cream.

Next is the cold pantry with large refrigerators where salads, sandwiches, cold cuts, canapes, fruit juices, etc., are prepared and chilled on a new ice table until the minute before they are placed on your table.

The coffee pantry has two ten gallon and one fifteen gallon coffee urn, a toaster that turns out 750 slices of toast per hour, electric broiler, cup warmer and refrigerators for cream and milk.

Directly forward of the ranges and between the coffee pantry and the dishwashing pantry are large racks for dishes, glasses and silverware, so arranged that the waiter has his dishes on his left as he picks up his food on his right from the different stations.

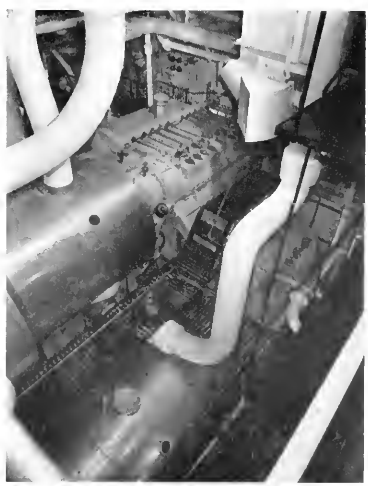
A pantry for the cabin class dining room is located in the aft starboard corner of the main galley. In the same corner, on the port side, is the chef's office and quarters and the quarters of the sous chef and pastry chef.

Eight pantries are scattered conveniently about the ship for serving bouillon, coffee and tea, sandwiches and light luncheons. One is located on A deck, two on B deck, three on C deck and two on D deck.

The crew's galley, for unlicensed personnel, is a smaller version of the main galley and is located on E deck, one deck above the crew's mess. Food is carried on a dumb waiter between the galley and messroom.

Refrigeration

Although the *Lurline* is well known as a de luxe passenger liner, she is also a fast, express cargo vessel, and



Lurline's starboard power plant. High and low pressure turbines. Falk reduction gear. In the rear are twin De Laval oil purifiers.

will carry enough commercial cargo to fill 110 railroad box cars.

Actually, in addition to carrying all the food, stores and supplies for her passengers and crew, she has dry cargo space totaling 233,732 cubic feet and eleven huge cargo refrigerators with a total capacity of 57,304 cubic feet. The Carrier Freon Machinery for this purpose is located on G deck machinery flat. All of the refrigeration boxes and chambers were constructed to suit Matson insulation and cold distribution specifications which have been developed by special research to meet the requirements of the line by Carrier Corporation, whose John F. Kooistra and Matson's Lester L. Westling had much to do with the very efficient distribution of cold air through the cargo.

Fresh Water

The *Lurline* has two new giant evaporators, among the largest units of their type ever placed on any ship, with a daily capacity of 40,000 gallons of fresh water each. Together they supply 80,000 gallons per day, sufficient to supply all the ship's needs.

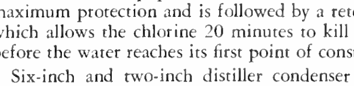
Most passenger ships depend upon shoreside water stored aboard to meet their requirements.

The new *Lurline* has nine potable, fresh water tanks, always kept purified and immaculately clean, with a total capacity of 279,029 gallons and, in addition, carries 268,000 gallons of fresh water for her boilers. This is enuogh water to supply a town of 6,000 population.

With her new fresh water evaporating system, the *Lurline* keeps her fresh water tanks always filled, insuring maximum stability and riding comfort at all times, as well as plenty of pure fresh water for her passengers and crew.

The equipment for purification of the ship's water supply as furnished by Wallace & Tiernan Company consists essentially of a hydraulically operated pump which injects chlorine into the water supply in proportion to the amount of water flowing into the ship's distribution system. All of the ship's water supply passes through a disc meter which controls the operation of the hypochlorinator in proportion to this flow of water. This same type of equipment is used on small municipal water supplies with special modifications making it adaptable for shipboard use. The equipment is installed in duplicate for maximum protection and is followed by a retention tank which allows the chlorine 20 minutes to kill all bacteria before the water reaches its first point of consumption.

Six-inch and two-inch distiller condenser circulating pumps, as well as condensate and evaporator pumps were furnished by Warren Steam Pump Company, who also supplied the air conditioning plant pumps and the fresh water pumps. Pipe covering in various parts of the ship was installed by Western Asbestos Comany of San Francisco. Installations covered all pipe insulation including chilled water, hot and cold water, flushing water, plumbing drains, sanitary drains, fire lines, all Freon and brine piping to the refrigeration system; also insulation for all machinery piping, including all steam and water piping in the engine and boiler rooms; insulation of all steam turbines and steam machinery and refrigeration machinery including pumps, coolers and compressors; all air ducts including air conditioning ducts and the fresh air supply to all parts of the ship.



Cargo Gear

One of the *Lurline's* four hatches is set aside for passenger automobiles. There is room in this hatch for 55 automobiles plus other cargo.

The ship has eleven cargo booms, including one 30 ton derrick, served by electric hoists designed to give high speed, silent operation.

With her vast cargo capacity, the *Lurline* hauls frozen foods, automobiles, household goods and a thousand different items on her express schedule between California and the Hawaiian Islands.

Electrical

The Dahl-Beck Electric Company installed and supplied running light panels, alarm panels, bells, watertight fixtures for decks and bulkheads, and sound power telephones.

The fire detecting and fire extinguishing systems were furnished by Walter Kidde and Company, Inc. This and the Rich Smoke Detecting System and the Lux (Kidde) System, extended to cover the domestic refrigerator boxes, so that now all the spaces on the vessel occupied by cargo and machinery are protected with carbon dioxide fire extinguishing, were installed under the supervision of Hough and Egbert Company, San Francisco, as was also the Selex System.

Telephone System

The ship has a 400-line telephone system for passengers and two separate telephone systems for use of the operating personnel.

The passenger telephone system office is located on E deck just off the main foyer and from its busy switchboard run lines connecting lanais, first class staterooms, all public rooms, offices and decks, thus making all the ship's many services instantly available to the passenger. The PBX system gives 24-hour service.

As soon as the ship docks, lines are connected with the shore system so that passengers can place or receive calls from their own staterooms exactly as if they were in their own homes.

The *Lurline* also has a ship-to-shore telephone, a part of the radio system, over which calls to or from any part of the world may be made over any passenger telephone or from private telephone booths, one in the forward sun deck foyer and the other in the cabin class smoking room.

One of the telephone systems for the operating personnel has its main station in the wheelhouse with branches to important points throughout the ship; the other is located at the engine room main control platform and has branches in the various machinery spaces such as the fire rooms, steering engine room, refrigeration machinery room, etc.

As a safety precaution both these systems are independent of the ship's electrical systems.

OPERATING EXPERIENCE ON THE 2000-HP GAS TURBINE

By T. J. PUTZ*

A year ago Westinghouse announced an experimental 2000-hp land gas turbine. Tests on the turbine while incomplete, have gone far enough to confirm hopes of its originators. The experience gives substantial evidence of the gas-turbine's eventual success for industrial and transportation use.

In more than 1000 hours test operation the performance of the 2000-hp gas turbine has been essentially in accord with design predictions. Operation under all types of load conditions and up to the design temperatures has caused no objectionable distortion and no serious creepage. The unit has not operated without difficulties but they have not been of fundamental nature and have been such things as can be readily corrected in new designs. On the whole, at this stage, the experimental evidence points to the soundness of the general design employed in this form of simple, open-cycle gas turbine.

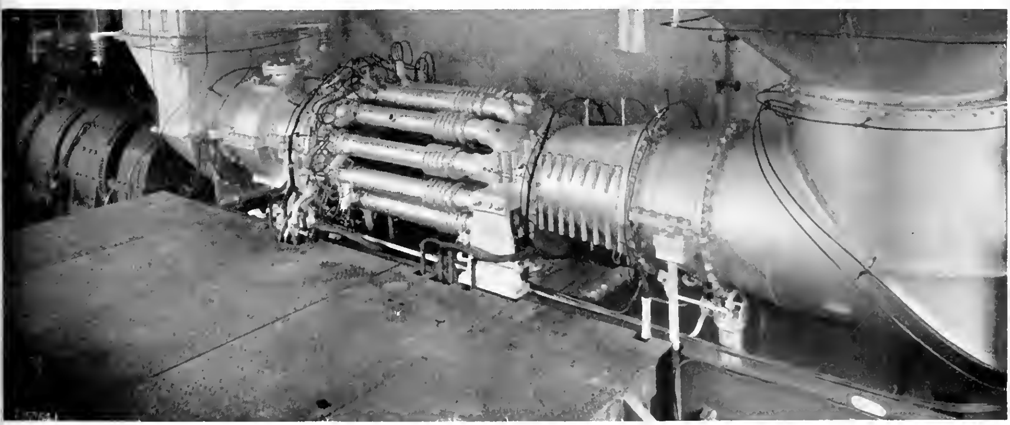
**Manager, Locomotive and Gas-Turbine Engineering Section, Marine Turbine Engineering Department, Westinghouse Electric Corporation, South Philadelphia, Pa.*

The turbine has been on test since August 1, 1946. The unit has been operated approximately 1000 hours, of which more than 850 hours have been accumulated since July 9, 1947. Three hundred hours of operation have been spent in evaluating the performance of the unit and its components. The remainder of the time has been used in simulating the more severe operating cycles expected on this type of unit in actual service.

Accurate overall performance has been established by reliable measurements of power output, fuel flow, speed, air inlet temperature, and atmospheric pressure. The overall fuel rate at full load is 0.78 pounds per brake horsepower per hour, which corresponds to a thermal efficiency of 16.7 per cent based on the fuel having a heat value of 19,500 Btu per pound. The maximum output obtained on the unit has been 2220 hp, when operating with an air inlet temperature of 48 degrees F.

Evaluation of the component performance of even this simple type gas turbine has been difficult. Many changes in instrumentation and laborious heat-balance

The experimental 2000-hp gas turbine consists of a unit on a single bedplate. The elements, reading from left to right are two d-c generators, gear, air intake, axial flow compressor, multi-element combustors, gas turbine, and exhaust. The unit, itself compact, lends itself to a narrow, in-line arrangement, which would be particularly desirable for locomotive service. The unit is 26 ft. long, six ft. high, and three and one half ft. wide and weighs complete but 19 lbs. per horsepower.



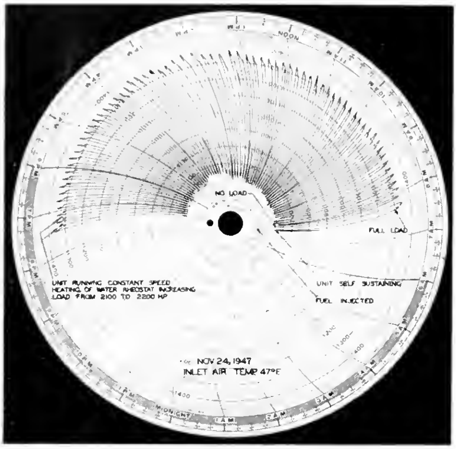


Fig. 1—A representative temperature record chart of cyclic tests on the gas turbine simulating locomotive service. Temperatures of 1300 to 1350 degrees F correspond to full load while 600 to 650 represents no load. The actual loading and unloading of the turbine, as measured electronically, is faster than the chart indicates because of the time lag in the themocouples used to actuate the recorder. At full load the chart shows a gradual increase of temperature from 1300 to 1350 during a five minute period. This corresponds to a load change of from 2100 to 2200 hp and results from the type of control and method used for absorbing the load.

calculations were required to achieve the desired results.

The compressor performance was established by measuring air flow, inlet and discharge pressures, and temperature rise. The adiabatic compression efficiency was found to vary from 80 to 86 per cent over the entire operating speed and load range.

To determine the turbine efficiency in a complete plant without a dynamometer between compressor and turbine requires the accurate measurement of inlet and exhaust temperatures and pressures. Of these the temperature of the combustion gases as they enter the turbine is particularly difficult to measure. Three methods were used in this determination:

1. Direct measurement, using specially designed, shielded type temperature probes. 2. Calculation, taking combustion efficiency as 95 per cent, measured air and fuel flow, measured combustion inlet temperature, and neglecting all radiation losses. 3. Calculation, using the measured turbine exhaust pressure and temperature, measured inlet pressure, and turbine work by heat-balance calculation.

The turbine efficiency as obtained using the temperature recorded by direct measurement gave least reliable results, while the second and third methods were quite consistent and in close agreement. The turbine efficiency varied from 84 to 86 per cent over the operating range. This is about two points lower than that obtained with earlier test results and is due to the increased radial tip clearance, found necessary for rapid changes in loading.

The combustion efficiency using specially designed air-atomizing nozzles was found by heat-balance calculation to vary between 94 to 96 per cent. These values agree closely with those obtained on separate combustion tests at our Research Laboratories.

The unit has been started from a cold standstill condition 350 times and has undergone several thousand rapid load cycle changes from no-load to full load. Loading and unloading cycle tests have been made to prove its load-response characteristics. Probably the most severe load cycle to be encountered in actual service will be in locomotive operation where continuous loading and unloading occur. This corresponds to rapid temperature changes of from 600 to 700 degrees F on the turbine and combustor, the turbine inlet temperature being 1350 degrees F at full load and 600 to 750 degrees F at no load. To simulate locomotive operation, the unit was run at full load for 30 minutes, then immediately unloaded and run for 30 minutes at no-load, whereupon load was reapplied in 10 to 20 seconds, and the cycle repeated. This cycle was then changed to limit the loaded and unloaded time to 10 minutes instead of 30. To accelerate the test program, a further change to 5 minutes was made when tests established that this time was sufficient to heat or cool the parts of the unit subjected to rapid temperature variation. A typical load cycle is shown in Fig. 2.

The unit is very easy to start, one generator being used as a motor. The time required is a function of the starting power available. When this power is limited to a maximum of 35 kw, the unit can be started in about 2½ minutes. With a maximum of 80-kw starting power the unit can be started in 1 minute; with 20-kw the time is 8 minutes. When the rotor reaches 15 per cent speed the acetylene igniters are turned on, and at 25 per cent speed the fuel is injected. The starting power is shut off at the end of 1½ minutes, and the unit reaches a stable self-sustaining speed in about 2½ minutes. A gas turbine of this type can be operating at full capacity ten minutes from the time starting is initiated or even less if necessary.

During the early weeks of the test period, the compressor inlet and exhaust ducts were equipped with sound suppressors. When it became apparent that the noise level in the test house and the surrounding areas is reasonable and is not objectionable to the operators or the workers, the suppressors were removed.

The unit has also been operated without an air filter at the compressor inlet. In this respect we are less fortunate than our Swiss friends who have clean, fresh, mountain air available. The compressor blading becomes excessively dirty after approximately 100 hours of operation. This fouling with oily, dirty soot causes a drop in compressor efficiency of about two per cent, and it is then necessary to wash the compressor blading. The washing operation consists of turning the unit over slowly with a starting motor, spraying a non-corrosive commercial solvent into the compressor inlet, allowing it to soak for a few minutes, and then washing it off with a steam spray. This can be done without dismantling any part of the compressor.

Operation of the unit has not been entirely devoid of trouble. Two important casualties have occurred, one on the turbine and the other on the compressor. In anticipation of such difficulties, partially completed replacement parts were available; nevertheless, approximately three months were required to restore the unit

to operating condition in each case.

The first mishap was a failure of the turbine blading following 57 hours of operation. This was caused by a severe rub caused by movement of the turbine inlet bearing support on rapid temperature changes. Tests made subsequent to the failure indicated the inlet bearing support deflected downward approximately 1/16 in. with sudden increases in temperature, returning to its correct position after temperature equilibrium was established. The method of supporting the turbine inlet bearing has been changed and no rubs have since occurred.

The second casualty was a failure of the stationary compressor blading after 125 hours of operation. The blades failed because of fatigue at the blade root due to forced vibration. Fortunately, the failure was discovered before many blades failed completely. The rotating blades, except for the last row which was replaced, were undamaged. The stationary blading was replaced using the original blade design, modified to accommodate a riveted shroud.

Strain gauges were also installed on this blading, and have revealed the nature of the forced vibration. Although some minor mechanical failures in the stationary blading are still occurring because of the difficulty of incorporating all the desirable features in an original design, future designs should be entirely free of this trouble.

A No. 3 furnace oil has been used as the fuel for most of the testing. Tests have also been made with bunker C oil, which showed an increase in plant fuel rate of approximately eight per cent, partly due to its lower heating value and partly to lower combustion efficiency. Investigations made after 30 hours of operation with the bunker C oil revealed erosion of a critical part of the fuel nozzle that seriously affected its spray angle. Subsequent tests made with these nozzles showed that this change in spray angle, while seriously affecting the efficiency when using the bunker C oil, had no appreciable effect when the No. 3 furnace oil was used. A new set of nozzles, designed to eliminate erosion is now in use.

The future experimental program consists of continuing the cycle testing to gain further operating experience and to design and test controls for particular applications. Tests will be conducted using the heavy bunker C oils.

Life characteristics of this unit will be determined by actual field application. Testing has progressed to the point where actual life tests must be made. To prove this type of power plant, consideration is being given to some field application where fuel costs are low and 100-per-cent reliability is not immediately essential.

The test results and operating experience have been most encouraging. The unit is easy to start and control, runs smoothly, and is not excessively noisy. Some sacrifice in efficiency has been made to gain reliability by increasing blade clearance.

Examination of the heated parts of the unit has not shown any signs of distress. There has been no measurable creep of any stressed high temperature part. Fluorescent penetrant tests have revealed no cracking or heat checking on the parts subjected to rapid temperature variations.

The experience gained from this unit indicates that this type of prime mover can be made practical for power generation using heavy fuel oil or gas. The tests have clearly shown that a simple, open-cycle gas-turbine power plant having a fuel rate of 0.6 pounds per brake

(Please turn to page 107)

Figure 2—The relationship of fuel consumption to speed.
Figure 3—Variation in the fuel rate and turbine inlet temperature with variable speed and constant speed operations.
Figure 4—Performance during typical cold unit start from standstill together with the starting power required. The unit has been started from a cold condition 350 times.

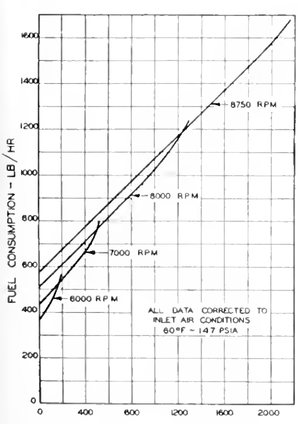


FIG 2

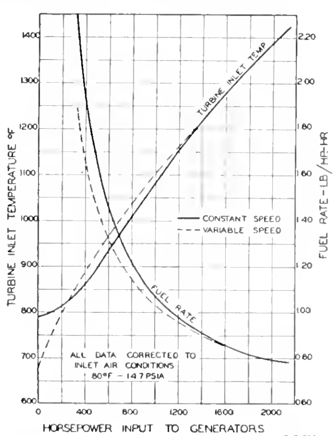


FIG 3

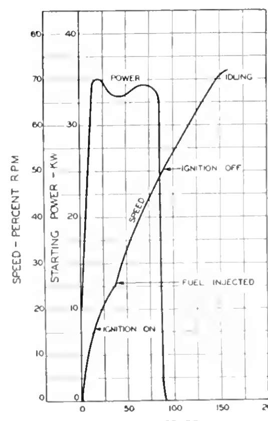


FIG 4

Portable Dry Docks

(An Editorial)

IN THE PROGRAM for using portable drydocks for servicing the ships of the lay-up fleets, the Maritime Commission seems to be acting in direct opposition to the theory of preparedness and development of merchant marine adjuncts which the country has accepted in the Merchant Marine Act of 1936 and the Ship Sales Act of 1945; also in the presumed approval of the report of the President's Advisory Committee on the Merchant Marine. Just as important as the building of ships is the maintenance of shipyards, and the Commission should not be setting itself up in competition with private yards—*under any circumstances.*

Furthermore, the twoboat services in this and other major harbors should be kept in action and encouraged to grow. They are a very real part of the Merchant Marine and are needed in every emergency.

A top shipyard executive recently estimated that to train a shipbuilding mechanic takes a working lifetime. The government must not set itself to siphon off these expert mechanics and break up the staffs of the private yards for sporadic jobs. We go right along with Gerrish Smith, president of the Shipbuilders' Council, in his argument with the Commission. Important points in his case are contained in the following:

The drydocking and repair of merchant vessels in peacetime normally constitutes the livelihood of the ship repairing branch of the industry. Like the shipbuilding branch of the industry, the ship repairing branch is essential to national security and it will not be available to perform its wartime functions unless it can remain a healthy and progressive industry in peacetime. It would be ironical if the successful effort of the industry in creating a merchant fleet under the leadership and with the support of the Commission since 1936 and especially during the war should lead to the destruction or crippling of the industry.

The shipbuilding and ship repairing branches of the industry are mutually interested in this subject as, to a considerable degree, they are interdependent. They employ similar types of skilled craftsmen in their mechanical staffs and some members of the industry are engaged in both shipbuilding and ship repairing.

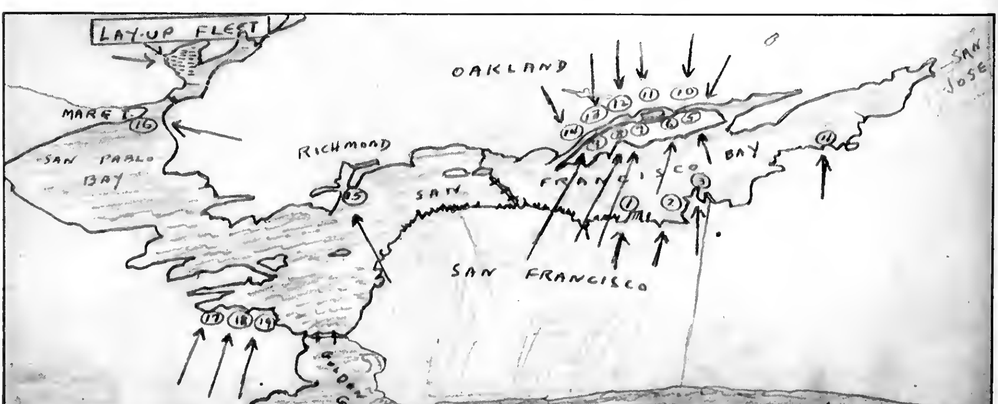
The facilities in both branches of the industry were greatly expanded during World War II and in general are more than adequate to meet any foreseeable peacetime demand. This expansion, in some instances, included Navy-owned drydocks. When additional drydocking facilities are required in particular localities because such facilities are at present lacking or are deemed inadequate, the industry will undoubtedly consider the acquisition of drydocks from the Navy by sale or lease in order to place itself in a position to undertake any drydocking and underwater work required for the maintenance of the vessels laid up in the reserve fleets of the Commission. This is presently the subject of discussion with the Navy. The use at the reserve fleet sites of Government-owned and operated drydocks, which drydocks in part at least would be taken from those owned by the Navy, will thus inevitably tend not only to resrrict the utilization and indeed the need for Government-owned drydocks now installed in private yards but also to prevent any prospective additional installations of such drydocks in private yards. Any financial return to the Government from the sale or lease of such drydocks to the industry thus necessarily will be seriously limited and curtailed.

The installation and use of these drydocks at the reserve fleet sites would be a further and most serious and dangerous advance of the Government into competition

Shown on the sketch below of the San Francisco Bay Area contiguous to the layup fleet base (upper left) are nineteen shipyards with drydock facilities. There are others with marine railways only.

The arrows in the diagram point to the following yards:

1. Bethlehem—San Francisco; 2. Anderson & Cristofani; 3. Hunters Point Navy Yard; 4. Barrett & Hilp; 5 to 9. Amship Co., Pacific Bridge Co., Bethlehem-Alameda, General Engineering & Drydock, Todd Drydock (United Engineering) 10 to 14. Hurley Machine Works, W. F. Stone, Pacific Drydock & Repair, Graham Ship Repair, Moore Drydock; 15. Richmond Yard No. 3 of the Maritime Commission; 16. Mare Island Navy Yard; 17 to 19. Arques Co., Madden & Lewis, Nunes Bros.



with private industry, and with an industry the volume of work available for which has drastically fallen and still is shrinking. It is doubtful that such an installation and use can be justified in any way on the basis of Governmental economy, but even if it could be conclusively established that such an installation and use would be economical to the government, the expansion of government into another private field is fundamentally opposed to our political and social ideals.

The surplus Navy drydocks, the use of which is contemplated for this purpose, were constructed by the Navy solely as war facilities. Many of such drydocks are or can be absorbed by the industry on a sale or lease basis; to the extent that such drydocks cannot immediately be so absorbed, the remaining drydocks, if considered necessary for retention in the event of another national emergency, can most economically be laid up in the same manner as other floating equipment rather than be placed in direct competition with those which are or can be so absorbed.

In drydocking a vessel for periodical inspection at a reserve fleet site, such vessel must first be broken out of the fleet and towed to the dock. After undocking, the vessel then must be returned to the reserve fleet. The identical operation is required if the vessel is towed to a private ship repairing yard for drydocking. The only difference is in the distance towed, depending upon the location of the private ship repairing yard with relation to the reserve fleet. The cost of the drydocking operation and of the work performed while the vessel is in drydock must be borne by the Commission in either event.

If such a vessel, when drydocked by the Commission for inspection, survey and application of protective underwater coatings, were found to require some minor underwater work, such as repairing sea chest valves, leaking seams and rivets, repacking stern tubes, removing heavy and rough scale before applying paint, etc., it would not be economical for the Commission to remove the vessel from the drydock and take it to a repair yard. It, therefore, is only reasonable to assume that the Commission would inevitably in time undertake to make such minor repairs. This could only result in the establishment of paint shops and machine shops and the installation of air compressors, cranes, welding equipment and all the other shore facilities necessary for the operation of a drydock and the provision of personnel necessary for handling such facilities. Obviously, these facilities would then become available for major underwater repairs and topside repairs as well, so that, eventually, all repairs would be undertaken. Various factors would contribute to the ultimate utilization of these facilities for all purposes.

Even though no repair facilities are installed at present in conjunction with a drydock at a reserve fleet site, underwater inspection may well reveal repairs that should be put in hand. The Commission is then faced with these alternatives: it may defer such repairs, or it may then undock the vessel, tow it to a private repair yard, have the vessel redocked and the repairs made, and then return the vessel to the reserve fleet.

Neither alternative is in the national interest. If the first is adopted, in the event of national emergency the vessel will then require drydocking and repair before it can be placed in operation and in all probability at the very time that all repair yards and drydocking facilities will be congested with work. If the latter alternative be adopted, there is duplicate drydocking involving unnecessary expense and additional time.

On the other hand, if a vessel laid up in a reserve fleet is taken to a commercial drydock in a private repair yard for periodical drydocking, all underwater work found to be required can be accomplished at one time and without duplication of any costs, and the vessel will then, so far as underwater work is concerned, be in a spot status, ready for emergency service, without the necessity of further drydocking for a period of several years, particularly if laid up in fresh water, which is usually the case. This would minimize the drydocking load in the event of national emergency when such load in any event will be the heaviesr.

The initial cost of installing surplus Navy-owned drydocks at the reserve fleet sites will be heavy. Some of the docks available are located at great distances from the reserve fleet sites. The cost of moving each drydock to the reserve fleet site and there installing it will amount to hundreds of thousands of dollars. Installation will require extensive dredging, pile driving for mooring, construction of access piers, provisions for power, etc. Because of the generally isolated locations, office and living accommodations for the operating and administrative personnel may be required. Maintenance and operating costs likewise will be substantial. Periodical dredging will be required. Thus the total cost of installing, operating and maintaining such facilities will be a very substantial amount.

After World War I, the drydocking and underwater protection of vessels laid up in reserve fleets was handled by the ship repairing branch of the private industry. That industry is in a position again satisfactorily to perform this work for the present reserve fleets. It is understood that the original policy of the Maritime Commission, immediately after the conclusion of World War II, did not contemplate the acquisition and operation of drydocks by the Maritime Commission, but rather a contractual relationship between the Maritime Commission and the several private ship repairing yards involved for the performance of such work on privately operated drydocks. It is submitted that the present program is a reversal of this prior policy to the detriment of the ship repairing industry, and, as previously stated, of at least doubtful advantage to the Government. This reversal is an example of the risk of change in policy which makes the industry doubt the permanence of the present intent of the Commission not to engage in repair work.

The close relationship between an active and progressive shipbuilding and shiprepairing industry and national security has been abundantly demonstrated by two world wars. The availability of both branches of the industry for efficient performance in the event of another national emergency is contingent upon efficient and healthy operation in peacetime.

In San Francisco Bay alone there are nineteen drydock yards with from one to six docks. (Two of them are Navy yards.) Also, there are other yards with marine railways and other ship repair equipment. These yards should not be precluded from the work of underwater servicing of the reserve fleet vessels as they are kept in condition or prepared for withdrawal.

Golden Bear

Accomplishes Historic Good-Will Mission

State Nautical Schoolship "Delivers the Goods" From California

Commodore Ihrig

ON DECEMBER 15, 1947, the California Maritime Academy presented to Governor Warren a recommendation that the State Training Ship *Golden Bear* be designated to carry a relief cargo of food and clothing to one or more countries in the Mediterranean on the annual training cruise. Governor Warren promptly approved and sponsored the project and appointed Maurice C. Sparling, State Superintendent of Banks, as the Chairman to organize and effect the collection of relief cargo. The State Junior Chamber of Commerce was requested to handle the details of collection by its local committees throughout the State. For both practical and humanitarian reasons, it was decided that milk for children should be the major portion of the cargo. The collection campaign was organized accordingly and the *Golden Bear* was designated for the trip as the "California Milk Ship."

Meanwhile, arrangements for free services were completed for loading at Stockton, Oakland, San Francisco, Long Beach and San Diego. Stevedoring services at Stockton and San Diego were contributed free, while the Pacific American Shipowners' Association paid for stevedoring at San Francisco and Long Beach. Free stevedoring was provided at Oakland by the Naval Supply Center. By agreement with the union, stevedoring of the small amount of cargo to be loaded from the Vallejo area over the Academy pier was to be done by the midshipmen of the Academy as a practical drill. Free wharfage and dockage was granted the State schoolship by Stockton, Long Beach and San Diego. The Naval Supply Center at Oakland provided free services at their modern terminal and Pope and Talbot, Inc., contributed Pier 38 at San Francisco.

The U. S. State Department effected diplomatic clearance, arranged for free services at Marseilles, Genoa, Naples and Piraeus and designated American Aid to France, American Relief for Italy, and the Greek War Relief Association as the consignees for the reception and distribution of the relief cargo. Free Panama Canal tolls were granted, together with export and customs clearance. After much difficulty arising out of the world-wide fuel shortage, fueling was finally pinned down at Curacao, Gibraltar and Algiers. The Navy Department fueled the *Golden Bear* at Gibraltar and Algiers.

Meanwhile, the training ship was being prepared, for the first time in the history of any State nautical schoolship, to "carry the freight." The midshipmen installed

The Golden Bear leaves San Francisco for Los Angeles, with Governor Warren on board and the state flag at the foremast.

new boom rigging, held special cargo handling drills, installed shoring and dunnaging and re-arranged school-ship stowage to permit handling the cargo. Stores and provisions were loaded for a 21,000 mile cruise to last four and one-half months, touching nine foreign countries and the adjacent waters of four continents.

Special manifests and bills of lading were printed. The manifests were headed, "Manifest of good-will, hope and confidence as expressed through relief cargo contributed by the People of California." Governor Warren signed the documents for the State of California and leading American relief officials and government officials of France, Italy and Greece have signed for the people of those countries.

The *Golden Bear* sailed from the California Maritime Academy on January 14 and arrived, loaded and sailed on schedule from the five California ports, with Governor Warren, the Mayors and other leading officials taking part in the interesting and colorful civic ceremonies. The recipient nations were represented by their consuls and by children in native costumes. Gracie Fields, Joan Leslie, Margaret O'Brien, Leo Carillo and Johnny Mack

Governor Warren, Commodore Ihrig, Captain Swany and girls in native costumes at departure ceremonies.

Brown assisted over the microphone at the departure festivities. Governor Warren took passage on the ship from San Francisco to Los Angeles. At Los Angeles Don Gilman presented a check for $15,000 from the Western Oil and Gas Association as a contribution from the California oil companies to bear the cost of additional fuel required for the special cruise. The Rotary Clubs of San Francisco, Oakland and San Mateo presented the *Golden Bear* with $600 to be used to provide special sight-seeing transportation for the midshipmen in foreign ports.

On January 25 the *Golden Bear* sailed from San Diego on schedule, practically loaded to her cubic capacity, the cargo consisting largely of canned milk, other canned goods, some flour and clothing. Included in the cargo was approximately 300 tons of whole dried milk belonging to the United Nations International Emergency Children's Fund, for delivery to Italy and Greece. Also included were hundreds of special gift food packages addressed to individuals from relatives and friends. Special precautions were taken to prevent inclusion of con-

Oakland ceremonies. Left to right: Mid. Ball, Capt. Swany, Mrs. Earl Warren, Commodore Ihrig, Gracie Fields, unidentified lady, Mid Johnston.

traband articles such as tobacco and matches. Special precautions by the American agencies receiving the cargo were taken to prevent losses into the black market. Every crate was stencilled and carried specially printed labels in colors showing the American flag and stating, in the language of the three countries, that the gifts came from the people of California to the children of those countries. Most of the individual cans of milk were also so labelled.

En route to Gibraltar the *Golden Bear* received an SOS broadcast calling for medical assistance from the *SS Josiah Snelling*. Captain Swany back-tracked 270 miles, contacted the *Josiah Snelling* before daybreak, sent the medical officer and assistants over in a boat and brought the sick man on board the *Golden Bear*. A ruptured appendix necessitated an immediate operation, which was successfully completed, and the seaman walked ashore under his own power at Gibraltar six days later upon arrival. Thus, the midshipmen took part in another real practical drill representing one of the finest traditions of the sea in life-saving.

On March 20, one day after arrival at Piraeus, port of Athens, Commodore Russell M. Ihrig, Superintendent of the Academy, received a cable from Captain Swany that all the good-will cargo had been delivered and that Governor Warren had been so notified. The *Golden Bear*

(Please turn to page 82)

Capt. R. M. G. Swany receiving parchment from Mr. Carlini, mayor of Marseille, for delivery to Governor Warren.

The M. R. Chessman

New Steel Ferry Boat For Columbia River

TO MEET the demands of the steadily increasing traffic on the Coast Highway which crosses the Columbia River from Astoria, Oregon to Megler, Washington, the new welded, all steel ferry-boat, *M. R. Chessman,* was launched on December 10, 1947, at the Yard of the Albina Engine & Machine Works, Inc., Portland, Oregon.

The vessel was named for the late M. R. Chessman, a prominent member of the Oregon State Highway Commission, and was sponsored by his widow, Mrs. M. R. Chessman, of Astoria, Oregon.

The vessel was designed by the Albina Engine & Machine Works, Inc. to meet the special requirements of the run. During commercial fishing season the river at this point is literally filled with fish nets, and one of the special features is a propeller guard, to prevent damage to these nets as much as possible.

An exceptional feature, as vehicle-carrying ferries go, is the arrangement of the main or car deck, in that there is no engine room trunk to interfere with making the utmost use of all the deck space. There are five lanes, with one directly on center line for the loading of long semi and double trailers. This lane allows direct loading and unloading of these trucks without excessive maneuvering. All exhaust and necessary pipes, steering cables, electric conduits, etc., are carried through specially designed trunks in line with a double row of stanchions, which divide the truck lane from the four outside lanes.

Dining space is provided on the passenger deck to seat forty-four people, with a modern stainless steel galley and serving equipment adjacent.

The hull is longitudinally framed except in the forepeak and aft peak, and is divided into seven water-tight compartments with heavy web frames spaced at ten-foot intervals between the bulkheads. The main deck is supported by four longitudinal girders running the entire length of the ship. It is also framed longitudinally with

L. R. Hussa, President, Albina Engine & Machine Works, Inc. Naval Architect and Designer of the M. R. Chessman.

spacing of these deck beams so that no dual truck wheel will ever be unsupported by a structural member. The main deck plating is of 7/16″ figured floor plating for maximum grip.

The engine room compartment is sixty feet long and houses practically all the operating equipment, consisting of the following:

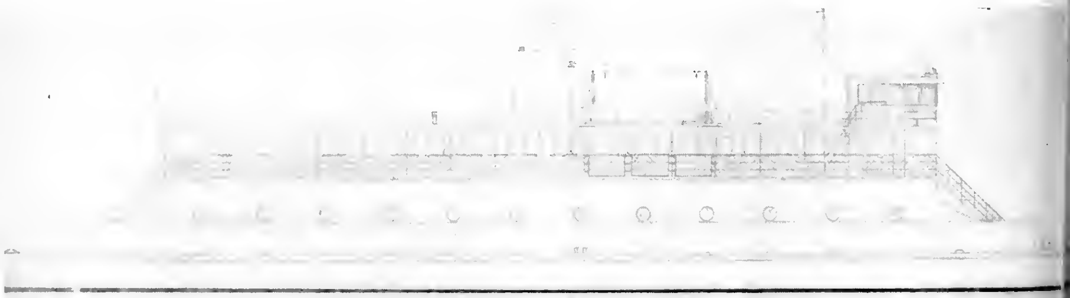
Main Propulsion Diesel Engine—Single Screw, Single End Drive 6 Cylinder, 16 x 20½, 800 hp Midel Z-6, manufactured by Union Diesel Engine Co., Oakland, California.

Two Auxiliary Diesel Generators—25 kw, 115 volt DC, Model MD-25, manufactured by U. S. Motors Corp.

Steering Gear — Hydro-Pneumatic, Type GAY with Type SMD Stand, manufactured by Markey Machinery Co., Seattle, Wash.

Pumps—manufactured by Buffalo Pumps, Inc., and

Outboard Profile of M. R. Chessman



supplied by Consolidated Services, Seattle, Washington.

Steam Heating Boiler—Cyclothern Marine Type.

Two Air Compressors—manufactured by Worthington Pump and Machinery Corporation.

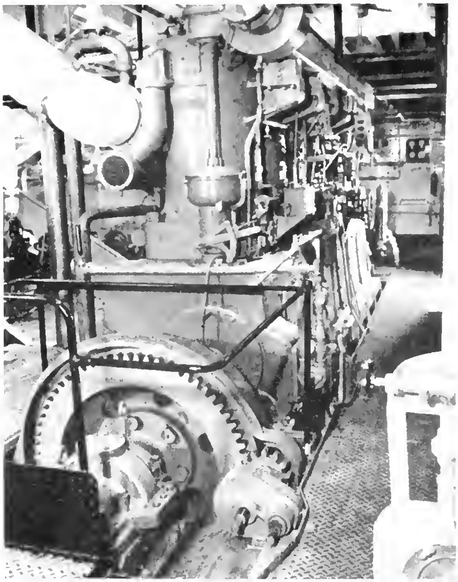
Fuel Oil Storage—4 Tanks with total capacity of 3600 gallons.

One Portable Water Storage Tank of 1,000 gallon capacity.

One Right Hand Bronze Propeller manufactured by Doran Co. of Oakland, California.

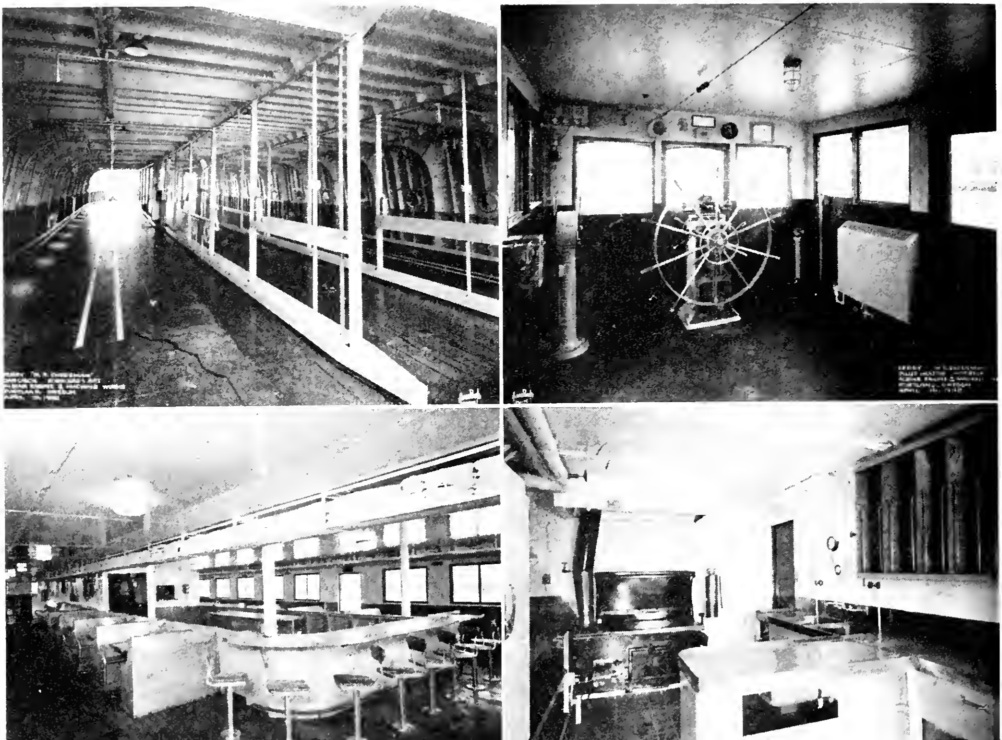
The new vessel was built under the rules of the American Bureau of Shipping and in accordance with regulations of the U. S. Coast Guard, and was delivered in early April, 1948. It is being operated by the Oregon State Highway Commission in conjunction with two other vessels now on this run. The particulars of the new vessel are as follows:

Length over-all	180′
Length between perpendiculars	170′-6″
Extreme Beam	51′-1½″
Depth Molded	14′-6″
Normal Draft	8′-6″
Service Speed	10 Knots
Capacity—40 Vehicles and 300 Passengers	
Loaded Displacement	710 Tons


Main engine of the Chessman, a Union Diesel.

Passenger deck plan and inboard profile.

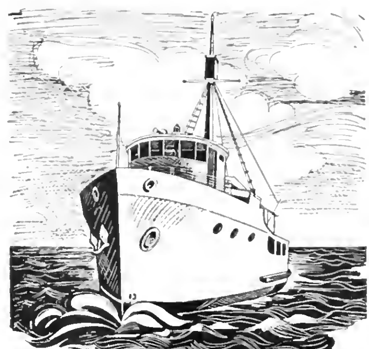
M. R. CHESSMAN



Views of the Chessman. Top left, cardeck forward and aft; top right, interior of pilot house; center left, restaurant aft and forward; center right, galley aft and forward; bottom left, engine room aft and forward; bottom right, engine room forward area.

ADDITIONAL PICTURES OF THE CHESSMAN ON PAGE 82

Coast
COMMERCIAL
CRAFT



VELERO IV
U. S. C. Marine Laboratory

THE USC MARINE LABORATORY, the *Velero IV*, is a specially built 110-foot steel laboratory ship. It was designed for use in marine biological, botanical and geological research and for experimentation and testing of new developments in the fields of marine engineering and naval architecture. This floating laboratory is an extension of the laboratory facilities of the Allan Hancock Foundation for Scientific Research of The University of Southern California.

The *Velero IV* is a vessel of 510 tons displacement, powered by a 600 horsepower Atlas Diesel Marine engine. Cruising range normally is approximately 8,000 miles. G. Bruce Newby of Long Beach was the naval architect and the ship was launched April 11, 1948 at the National Iron Works of San Diego.

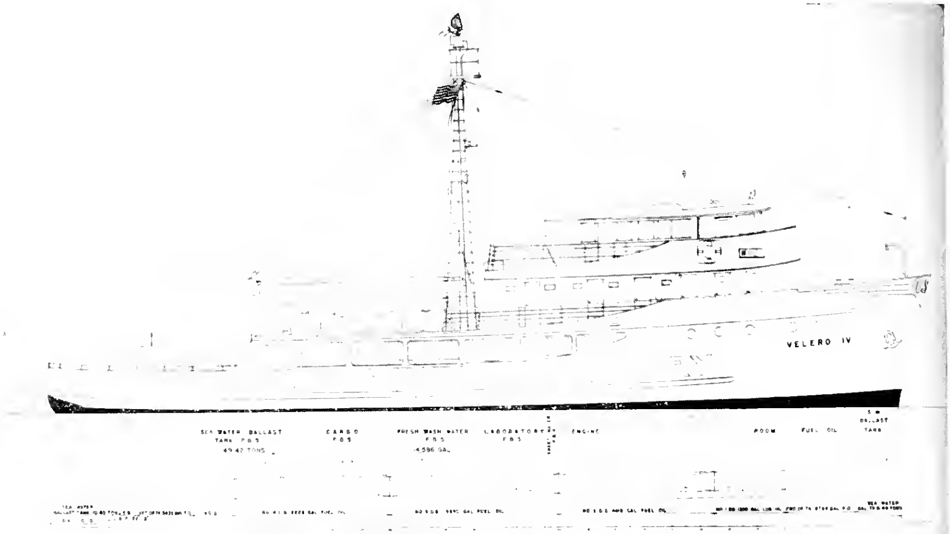
Velero IV

Capt. Allan Hancock, president of the board of trustees of The University of Southern California and director of the Allan Hancock Foundation for Scientific Research, is director of the expeditions and Master of the *Velero IV*. He also is director of the USC College of Aeronautics in Santa Maria, which he established in 1928.

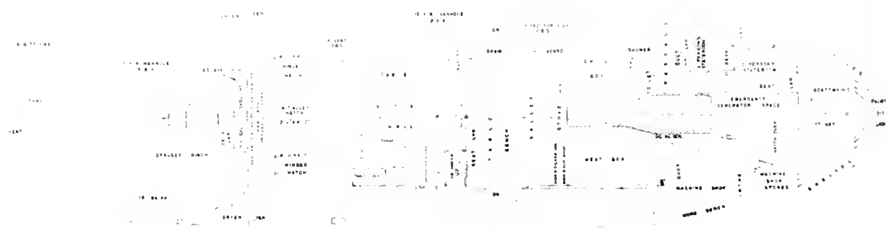
Electrical Equipment

The *Velero IV* is equipped with both an AC and a DC electric system in order to provide greatest versatility. Direct current voltages up to 120V are supplied by a bank of 1000 ampere-hour storage batteries. 110V and 220V alternating current are supplied by motor generator and alternator sets. The total available generated power is 150 kw. Prime movers for the generators are two 75 hp diesel engines, one 25 hp diesel engine and a connection to the main engine drive which can be used while the ship is underway. The 25 hp diesel driven generator is on the main deck for use under emergency conditions. Heating for the laboratories, pilot house, sleeping quarters and recreation room is supplied by electric heaters. Forced ventilation is supplied by means of electric fans.

The *Velero IV* is equipped with a Sperry radar unit capable of detecting objects 30 miles away. It is also equipped with a Sperry gyro-compass and automatic pilot mechanism. Data from this equipment will be transmitted to the bridge-deck laboratory so that it can be recorded and correlated with other operating data. A 4,000 fathom Submarine Signal Company Recording Fathometer with special electronic devices to extend the range has been installed in order to facilitate study of the contour of the bottom of the ocean. One laboratory also has electronic echo ranging equipment which may



PROFILE



MAIN DECK

HOLD

Profile and deck plans of Velero IV

VELERO IV

be used for experimental work in a horizontal plane.

Laboratories

Two permanent laboratories are contained in the number one hold port and starboard. One laboratory on the starboard side contains a dark room which is equipped with temperature controlled baths for developing several types of film. It also contains an enlarger and photomicrographic equipment. Part of this laboratory is fitted with complete chemical equipment for analyzing sea water and other items required for various tasks. The other permanent laboratory in the hold on the port side has special equipment to reduce the humidity in order to prevent deterioration of precision electronic, microscopic and other laboratory equipment in the tropics. Lockers are provided for the storage of photographic film. Two other laboratories are available in hold number three for special purposes. These are aft of the center of the ship and have purposely been left free of permanent equipment so that they can be especially fitted for the task at hand. Hold number two port and starboard is being used for fresh water and hold number four port and starboard for sea water ballast.

Special Equipment

The main deck is so arranged that a large laboratory space is available for preliminary investigation and sorting of marine specimens. This space can be opened for work in fair weather and can be completely closed for work in rough or inclement weather. A winch with 8,000 feet of ½″ steel cable and micrometric control is installed on this deck for use in sampling the ocean bottom for marine biological and botanical specimens. Provision has also been made for two smaller winches which can be used for manipulating an otter trawl and sampling with the scoopfish. Another winch is used to control the bathythermograph. Two large electric driers with forced ventilation have been installed on this deck in order to facilitate the preservation of scientific specimens. A 36-foot boom has been provided to raise and lower special coring equipment which will be used by marine geologists to take silt and soil samples from the bottom of the ocean.

A laboratory machine shop is installed forward. Usually equipment will be made in the Foundation's well equipped laboratory shop on Hancock Field in Santa Maria but modifications can be made in the ship's shop while at sea.

Other Facilities

The galley and recreation room are on the main deck. Space is provided for eight at the table in the recreation room and for ten at the table in the galley. Two large cold boxes are provided. One will be kept at low temperatures for frozen foods and the other will be used for the storage of meat and other items which need not be frozen. Special separate cold boxes for preserving scientific specimens are provided at various locations on the ship.

Auxiliary Craft

In addition to a power life boat for 20 persons the *Velero IV* carires a 16-foot motor boat, an 18-foot motor boat and a 16-foot skiff. These are specially fitted with scientific and communication equipment. The 16-foot motor boat is fitted with a power drag winch for collecting specimens in shallow water.

Communications

The Laboratory is equipped with several types of radio transmitters and receivers. The main ship-to-shore transmitter is a 250W Western Electric radio-telephone transmitter which may be operated either from the pilot house or from the radio room. Special short wave equipment has been installed in order to communicate with the College of Aeronautics Flying Laboratory and with the Hancock Foundation's radio stations in Los Angeles and at the College of Aeronautics in Santa Maria.

The *Velero IV* contains nine rooms which are designed to carry a maximum of 18 people. Several of these rooms are designed so that the bunks may be removed and the rooms used for housing special scientific equipment. They are completely wired and piped for laboratory use. Removable benches add to the versatility of these rooms.

Pilot House

The pilot house contains a scientific laboratory which will be used as a terminal point for recording technical data such as temperatures, pressures, salinity, ship's speed, depth of water, rudder angle, main shaft speed, stresses on various structural members and data from special installations in or on the outside of the ship. The wheel house is conventional except for a special flush escape hatch which is built into the floor so that easy access may be had to all parts of the ship in bad weather.

Marine Research

It is planned to continue expeditions in the eastern Pacific Ocean in much the same manner as was done with the *Velero III*. However, the *Velero IV* will be used for research on a much broader basis and it is anticipated that new and more effective devices and power plants for ships can be developed and tested in this laboratory. The facilities of the *Velero IV* make is well suited for research in the field of hydrodynamics and underwater ballistics. The complete electronic equipment offers the opportunity to develop new methods of radio communications and radar detection. The laboratory will be used for measuring loads imposed on ships by waves of various sizes and characteristics and the reaction of ships to loads imposed by various types of waves operating in various positions can be accurately measured for subsequent interpretation. This work at times will be coordinated with aerial photographic missions of the Flying Laboratory from the College of Aeronautics in Santa Maria.

WIRE ROPE BOOK

The Wire Rope Institute, a national organization with a membership representing most of the country's wire rope manufacturers, has recently published an attractive, 2-color combination catalog and handbook for general distribution to wire rope users.

This new 119-page publication, "Wire Rope," prepared and edited by the Institute's Technical Committee, contains a wealth of useful information in the selecting, buying and using of wire rope, along with data on fittings attachments, splicing, and other related subjects.

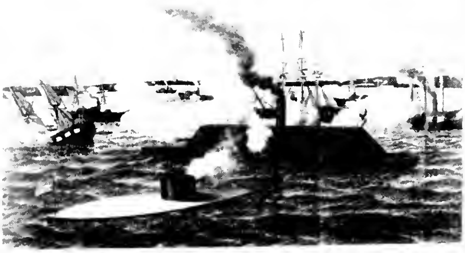
Copies are available without charge by writing to the Wire Rope Institute, 1044 Shoreham Bldg., Washington 5, D. C., Dept. 711.

History of

(Story on

Far left: Benjamin Stoddert, who became the first Secretary of the Navy on June 18, 1798.

Left: John L. Sullivan, present Secretary of the Navy.



THE FIRST BAT BETWEEN IRON

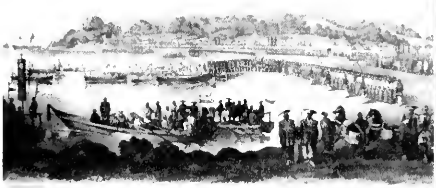
Opposite (center): First battle between "Iron" Ships of War. Engagement of the Federal "Monitor" and the Confederate "Merrimac" in Hampton Roads, Va., in March, 1862.

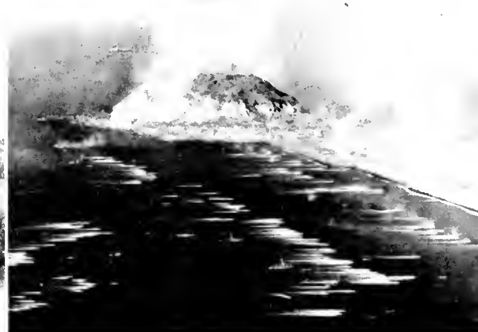
Below, left: First landing of Americans in Japan under Commodore Matthew C. Perry at Gore-Hama, July 14, 1853.

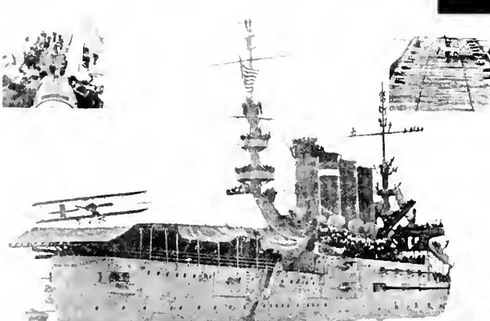
Below, right: Aerial view of amphibious operations, late World War II model. Landing craft move toward the beach in orderly waves while warships off shore bombard the beaches, and aircraft provide air coverage and fire support.

Bottom, left: Lt. Eugene Ely landing on platform aboard the USS Pennsylvania at San Francisco, January 18, 1911.

Bottom, right: The FJ-1 "Fury" taking off in a free deck run from the deck of the USS Boxer. This is in sharp contast to the make-shift flight deck, flimsy aircraft and slow takeoff speed which confronted Eugene Ely.







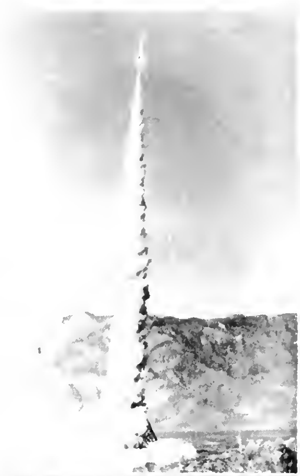
the Navy

Page 70)

CONTRAST IN FIGHTING METHODS

Right: Fighting uniform of an enlisted man in the 1860's.

Far right: New liquid-fueled rocket launched March 5, 1948 at White Sands proving grounds. The "Aerobee," designed for upper atmosphere exploration, reached a height of 78 miles above the earth and a speed of 4,400 feet per second.



Opposite, center: LST's at a Marianas port load equipment and supplies before heading for active fronts.

Below, left: Modern battle array, late World War II model. Here carriers, battleships and cruisers of a task force steam through the Pacific. Destroyers operate as a screen at some distance from the main convoy.

Below, right: Rocket launching landing craft letting go salvos of rockets against the beaches of Peleliu Island on D-Day preceding landings by troops of the First Marine Division.

Bottom, left: Navy's first submarine, the Holland. Invented and designed by John P. Holland, it was built by the Crescent Shipyard, Elizabeth, New Jersey, in 1898, and accepted by the Navy in 1900. In this picture, boat is buttoned up and starting to submerge.

Bottom, right: Post-World War II submersible. The Pomodon, SS-486, improved fleet-type submarine following conversion under the "Guppy" program.

History of the Navy

(Pictures on pages 68 and 69)

THE 150TH ANNIVERSARY of the establishment of the Department of the Navy was observed Friday, April 30, 1948 with appropriate ceremony in the various Naval Districts throughout the country.

At a crucial period in the history of the United States, President John Adams signed the act creating "an executive department under the denomination of the Department of the Navy" on April 30, 1798.

The last ship of the Revolutionary Navy had been sold in 1785; the troublesome situation with France over seizure of American merchantmen was approaching a crisis; England was at war with France, and had previously sought to cripple the growing American merchant fleet by arranging a truce between Algiers and Portugal that sent the Algerien pirates into the Atlantic; and the country at large was demanding an investigation into the delays encountered in completion of three frigates ordered in 1794 to combat the Barbary pirates.

Prior to that time, naval affairs of the new Republic had been the responsibility of the War Department. There had been, however, a separate Naval establishment during the Revolution, headed first by the Naval Committee and later the Marine Committee of the Continental Congress. It was only of wartime duration, though, and disappeared with the close of hostilities.

Such was the situation when Secretary of War James McHenry, perplexed over incessant naval problems that called for careful handling, submitted a lengthy report of his troubles to Congress, where he faced an investigation into the frigates' delay.

McHenry's report, submitted on March 22, 1798, concluded with the suggestion that perhaps "the marine business . . . ought to be separated from the Department of War."

Congress reacted by voting on March 27 an additional appropriation to speed completion of the frigates *United States, Constellation* and *Constitution;* and a month later, on April 27, passed an act to build, hire or purchase a dozen small cruisers.

As a result, the need was intensified for a separate Naval Establishment that could exert control over the embryo fleet; and a previously divided Congress adopted the legislation creating the Department of the Navy.

The act ended the War Department's responsibility for naval affairs, which had continued for less than 10 years from the time the War Department was created on August 7, 1789. At the same time, the Fleet came into actual service and the Navy Department began its continuous development to the present.

To solve the difficult task of securing the man best suited for the newly created office of Secretary of the Navy, President Adams turned to the young nation's outstanding shipowner-merchants. One of the leading shipping merchants of Georgetown, Maryland, accepted the office. He was able, energetic Benjamin Stoddert, who at the age of 47 possessed the qualities and experience needed to steer the young Navy during its first hectic years.

Stoddert was well acquainted with shipping through the house of Forrest, Stoddert & Murdock, which held a commanding position in the flourishing Potomac trade and maintained branches in London and Bordeaux. He had served as an Army captain in the Revolution before becoming secretary to the Continental Board of War, which served as a sort of War Department. As secretary to the Board, he was given ample opportunity to understand policies and details concerning personnel, material and finance, and made useful contacts with prominent government officials.

The new Secretary's expressed desire to retire "without bustle of any kind" soon became a wishful thought. Starting from scratch in the midst of the Undeclared War with France, he found himself virtually a one-man Navy Department and was forced to handle everything under emergency conditions.

Tackling his many-sided work with intelligence and vigor, Stoddert quickly built up a naval force to handle the French hostilities, pushed important legislation through Congress, and, establishing precedents almost daily, laid the foundations so firmly that the struggling new Navy Department was able to weather the anti-navy Jeffersonian period that followed his term of office.

Altogether, Stoddert raised the strength of the Navy at sea from one ship, the *Ganges,* a Philadelphia merchantman purchased for conversion on May 3, 1789—to 54; guided the Navy through its successful action with the French; established efficient working methods in the new Navy Department which were transmitted to many later Secretaries; and above all not only gave the nation a substantially founded Naval Establishment, but committed it to a strong naval policy.

On the subject of a strong naval policy, Stoddert anticipated Mahan's argument by almost a century in advocating a modest force of capital ships as the best guarantee of national security. In a report to Congress on December 29, 1798, he said:

"Twelve ships of seventy-four guns, as many frigates, and twenty or thirty smaller vessels, would probably be found (our geographical situation and our means of annoying the trade of the maritime Powers considered) a force sufficient to ensure our sufficient peace with the nations of Europe. . . ."

Stoddert left the Secretaryship a few weeks after Jefferson became President in 1801. It was generally known that Jefferson intended to minimize the Navy, and Congress had already voted to reduce drastically the Naval Establishment. The first Secretary went out of office, however, leaving the Department well braced to withstand the lean years ahead.

Later, Stoddert received his well-deserved accolade:

"A more fortunate selection could not well have been made. To the most ardent patriotism, he united an inflexible integrity, a discriminating mind, great capacity for business, and the most persevering industry."

Pacific WORLD TRADE
Reg. U. S. Pat. Off.

Reciprocal Trade Agreements As a Mechanism in Foreign Policy*

By MURRAY R. BENEDICT

Professor of Agricultural Economics
Giannini Foundation of Agricultural Economics
University of California

SOME FOURTEEN YEARS AGO the United States adopted a new mechanism for handling tariff negotiations known as the Trade Agreements Act of 1934. At the same time the Administration, with the approval of the Congress, adopted a new view with respect to the levels of tariffs deemed to be in the best interest of the United States. Because these actions were taken at the same time they are very generally assumed to be inseparable aspects of a single plan of action. This, I think I can shortly demonstrate to you, is not the case.

I speak briefly of the trade-agreement technique as distinct from the general policy it is designed to implement. This phase of the matter has been little discussed in all the great volume of material on this subject that has appeared over the past fourteen years. What I want to say under this heading is that the trade agreement technique is a better method than that of direct congressional action whether we want to *lower* or *raise* the general level of tariffs.

We have in the past used two general methods for dealing with tariff matters; one, to have the rates established in detail by direct congressional action; the other, to have the rates negotiated, within such limits as the Congress may choose to establish, by official representatives of the United States Government. The first of these methods was traditional up to 1934. That it has been a bungling and unbusinesslike procedure is pretty generally admitted by most people, whether advocates of high or of low tariffs.

Only twice in the long history of tariff legislation of

Murray R. Benedict

this country has this method resulted in a tariff act considered quite generally acceptable by the Congress itself; first in the Act of 1816, which provided a general increase in tariffs and, second, in the Act of 1857, which provided substantial decreases in the tariffs levied. Practically all of the other tariff acts were marred by political manipulation, log-rolling, and undue influence by powerful lobbies for special interests. Most were signed reluctantly by the presidents then in office whether their leanings were protectionist or anti-protectionist.

Under that method of tariff making changes can only

*Address presented to representatives of the Oakland and Berkeley Chambers of Commerce, Athens Club, Oakland, April 13, 1948.

be made by opening up the whole array of tariff schedules through a general tariff act, a process that in itself is disturbing to business, prejudicial to harmony in foreign relations, and frequently, as in 1930, a stimulus to general restrictive action in regard to trade throughout the world. To cite only one instance of the slipshod methods that must inevitably accompany an attempt by the Congress to deal directly with a tariff schedule containing thousands of items, I might mention the case of wool in the Tariff of 1867. A rate which more than doubled the one then in effect was concealed under a change in classification. The rate per pound of woolen cloth was raised from 24 cents to 50 cents, and then a 35 per cent ad valorem duty was added. This was even higher protection than the wool manufacturers had asked for, and they have not been notable for modesty in their requests. Similar cases could be multiplied many times over. This is because each individual congressman, with the multitudinous demands on his time and energy, cannot possibly be fully informed on all the complex relationships of so vast a problem.

For a very long time the tendency in our government has been to delegate to professionally staffed agencies the working out of complex problems of this kind. The Congress and the state legislatures do not attempt to fix the thousands and thousands of rates used by the railroads. At one time they tried it and it didn't work, even when our economy was much simpler than it is now. They do not attempt to define by law what shall constitute adulteration in foods or improper methods of competition, or appropriate regulations for the control of human and animal diseases. These are assigned to specially qualified professional groups with the legislative agencies laying down in fairly broad terms the policies that are to apply. No one would contend that these mechanisms work perfectly, but I think it can be demonstrated that this is the only possible way to deal with many of these problems if our legislative bodies are not to be utterly swamped with a mass of detail which they are unfitted to handle.

Now let us consider briefly the trade-agreements technique with respect to tariffs. This is a realm in which the problems are fully as complex as those mentioned above. But under this plan the tariff problem is not, for the most part, taken up on all fronts at once, even by the experts who deal with it. It is taken up country by country and commodity group by commodity group, with extensive analyses of the probable effects of this or that line of action. And, contrary to the beliefs of many who are not familiar with the process, it is not a procedure that is dominated and largely carried out by the State Department. All agreements are considered jointly by the Departments of State, Agriculture, Commerce, Labor, and Treasury and by the Tariff Commission and the Army and Navy. Seldom are they approved without substantially unanimous agreement on the part of these various agencies.

Furthermore, many protective devices are included in the process. All of the agreements are subject to termination by our government after they have been in effect three years. Many have now been in operation for more than three years, and are binding only so long as we see fit to leave them in effect. Some contain quotas designed to prevent any serious disruption of segments of our economy through excessive increases in imports. Others contain escape clauses that can be applied even before the end of the three-year period. I believe it can fairly be said that much of the concern about the trade-agreement procedure arises not from any demonstrable injuries that have occurred but from fears of injuries that may result from further use of this method of tariff making. As a whole I believe anyone who will study carefully the agreements thus far negotiated will be impressed with the care and discretion that have been used in working them out.

I cannot leave this phase of the matter without pointing out the very important consideration that the making of tariffs by *direct congressional action* eliminates all bargaining power on the part of the United States, whereas the trade-agreement technique retains it. Once the Congress has set a tariff by direct legislative action, that tariff is an established thing whether it be low or high. Other nations can establish whatever restrictions they choose without affecting our action. Under the trade-agreement procedure we can require concessions from other countries to offset concessions made by us, or, in the event concessions on their part are not forthcoming, can in our turn refuse to make the concessions proposed.

I think also that we should not overlook the fact that this method of dealing with tariff matters appears first, not in the Administration of Franklin D. Roosevelt as many suppose, but in that of William B. McKinley, one of the most strongly protectionist administrations in our history. True, the mechanism was not as fully developed in the Act of 1897 as in that of 1934. Nevertheless, the principle appears there in unmistakable terms. Something very similar was proposed by another Republican president, William Howard Taft, in his recommendation for reciprocity with Canada. That program failed of adoption, not through adverse action on the part of the United States but through failure on the part of Canada to approve the plan.

Lastly, though the subject is by no means exhausted, I want to mention the fact, not generally recognized, that the Act permits both increases and decreases in tariff rates at the discretion of the President. It is for this reason that I wish to dissociate the mechanism from the policy it is designed to implement. I feel profoundly that we must seek to lessen the restrictions on international trade if free enterprise and a healthy economy are to be preserved. At the same time I would say without hesitation that, if it should become the policy of the Administration and the Congress to increase pro-

tective tariffs I would rather see that action taken through the trade-agreements mechanism than through direct congressional action. I am convinced it would be done on the basis of better analyses; with less political manipulation, and with greater consideration for the national welfare.

Now a word as to the setting in which the problem must be considered at this time. We are, as you know, in a titanic struggle between two widely differing concepts of government; the one based on freedom in politics, business and personal affairs, and the right of people to govern themselves under laws made through orderly democratic processes; the other based on the seizure of power by militant minorities resolved to destroy what they cannot control. In this struggle the United States is the only nation able to take the lead in trying to rebuild a world in which free enterprise and private business can have a place comparable to what they have had in the past. If we refuse to accept that responsibility the drift into state-trading and managed economies is, I think, inevitable for most of the countries of the world.

The considerations are in part psychological and strategic. A decision to terminate the trade-agreements procedure at this time would be widely interpreted as a return to economic isolationism. It would be a serious setback to many people throughout the world who are sincerely striving to rebuild the kind of world I believe most of us want to see.

I think it is true that the major part of the program contemplated at the time the trade-agreements act was passed has been carried through. The agreements recently reached at Geneva and Havana, involving some twenty-three nations, form the most far-reaching step ever taken to set up an international code of fair practice in the conduct of international trade. If these agreements can be made to work we will have accomplished much of the task that needs to be done. But is it wise at this time to slam the door and say in effect, those that are not in now are out for good? In other words, there is need for bringing into the general private trade framework a considerable number of countries that are not at present signatories of the Geneva and Havana Agreements. This calls for further use of the trade-agreement approach since it could not be done through direct congressional action.

Furthermore, the conditions of our time are changing rapidly and in unpredictable ways. The arrangements for dealing with them should be kept flexible. Negotiations have of necessity been carried on at high speed. Modifications may be needed from time to time as the results of the actions taken become apparent, or as conditions change. Without the effective bargaining arrangements now available to the Executive, such adjustments would be virtually impossible.

I do not contend that the agreements reached at Havana and Geneva are ideal; nor would those who negotiated them. They are compromises, but compromises over a very wide front covering more than 45,000 items accounting for two-thirds of the import trade of the negotiating nations and half that of the world. These agreements constitute the setting of a trend in the right direction; not the attainment of a goal. But the goal is defined and set up as an objective. Without United States leadership it is meaningless. With that leadership it gives promise of eventual attainment.

If time were less limited I would seek to outline more fully the kinds of things included in these agreements but that would carry us too far afield for present purposes. I do think it worthwhile to point out that the International Trade Organization worked out at Havana will, if accepted by the various governments, provide the machinery for easy international consultation, obligate the member nations to consult with each other before taking actions that may be prejudicial to others, and set up in advance the rules of the game, which is one of the surest guarantees against economic warfare.

A further point seems to me to need mention. The renewals of the Trade Agreement Act from time to time over the past fourteen years have shown increasing bipartisan support. As first passed the Act was carried by a solid Democratic majority and opposed by a solid Republican minority. Since then it has come up for renewal four times. In 1937 and 1940 the vote was still on strict party lines. But in 1943 the plan gained substantial bipartisan support. In that year the "yea" vote in the House consisted of 196 Democrats and 145 Republicans. In the Senate 41 Democrats and 18 Republicans voted for renewal of the Act. Republican support fell off when the matter came up in 1945, but still was substantial. Thirty-four Republicans in the House voted favorably and in the Senate 15 Republican votes were cast in favor of renewal, only three less than the number cast in 1943. The program is coming to be regarded as bipartisan in character. This is as it should be. The time is past when the United States can afford a one-party foreign policy. The times are too serious, the issues too vital for us to fritter away our influence in world affairs by frequent shifting of our position as one party or the other comes into power. If we have to have family squabbles let's have them in our own house, not our in the street.

We should make up our minds what we want to do on foreign policy, using the best judgment available in both parties, and then follow that policy with reasonable consistency. Whatever direction the policies may take they can be better implemented, so far as tariff negotiations are concerned, through the mechanism of trade-agreements than through that of direct legislation by the Congress. We're going to need all the bargaining power we have. It would be poor business to slap all our cards down on the table face up, and invite the other players to govern themselves accordingly.

Port of Oakland Expanding Fast

By CLAIRE V. GOODWIN,
President, Oakland Board of Port Commissioners

As part of its unremitting efforts to make the Port of Oakland a distinct value to the progress and prosperity of the Metropolitan Oakland area, the Oakland Board of Port Commissioners is contemplating a series of improvements in the central and eastern section of the Inner Harbor which will materially aid industrial and commercial concerns in that area.

Some of these improvements center around the present construction by the State Highway Department of the Eastshore Freeway, a six lane high speed highway, which, in itself, will immeasurably increase values and accessibility of all property east of Lake Merritt. The Board of Port Commissioners has cooperated with the State in every way possible in expediting the construction of this sorely needed arterial by contributing rights of way, moving and altering buildings, trackage, etc.

When the Freeway is completed as far as the Oakland Municipal Airport, the Board will proceed with the construction of the long planned Embarcadero, a paved thoroughfare along the waterfront which will provide access to all portions of the Inner Harbor area. The roadway will be 80 feet wide, paralleling the Eastshore Freeway in some places, and extending from Fifth to Nineteenth Avenues at the beginning, and eventually from Clay Street to Nineteenth Avenue.

Arrangements have already been made to have this Embarcadero connect directly with the Eastshore Freeway. Provision was made in the construction of the Freeway for an on and off connection for eastbound traffic from the Embarcadero to the Freeway at Tenth Avenue, and a similar one for westbound traffic near Fifth Avenue.

The value of this integrated access arrangement in this area to firms operating there cannot be measured in round figures. It should greatly increase the flow of trade and commerce to the Ninth Avenue Terminal of the Port of Oakland and the plants and business establishments located in the vicinity of this pier, and to East Oakland generally.

In connection with the Freeway project the Board plans to rearrange the structures now located in the plant of the Pacific Dry Dock and Repair Company at the foot of Fourteenth Avenue in order to provide a right of way for the Freeway. Dry fill is also being placed on the north side of Brooklyn Basin from Tenth Avenue to Eighteenth Avenue to create new land area in place of that land given to the State for the Freeway.

The Board is also calling for bids for the first unit of its San Leandro Bay reclamation project south of the Eastshore Freeway and west of Hegenberger Road, a project which will eventually result in the reclamation of all the marshland north of the Oakland Municipal Airport and east of San Leandro Bay as part of the Board's Master Plan to eventually construct a marine terminal unit on this tidal basin.

This first unit will comprise the dredging and filling of 177 acres of land, which will be put to industrial use before the remainder of the work is completed.

Legal action has been started by the Board to acquire ownership of all land on San Leandro Bay between the Freeway and the Airport and between Fiftieth Avenue and Hegenberger Road.

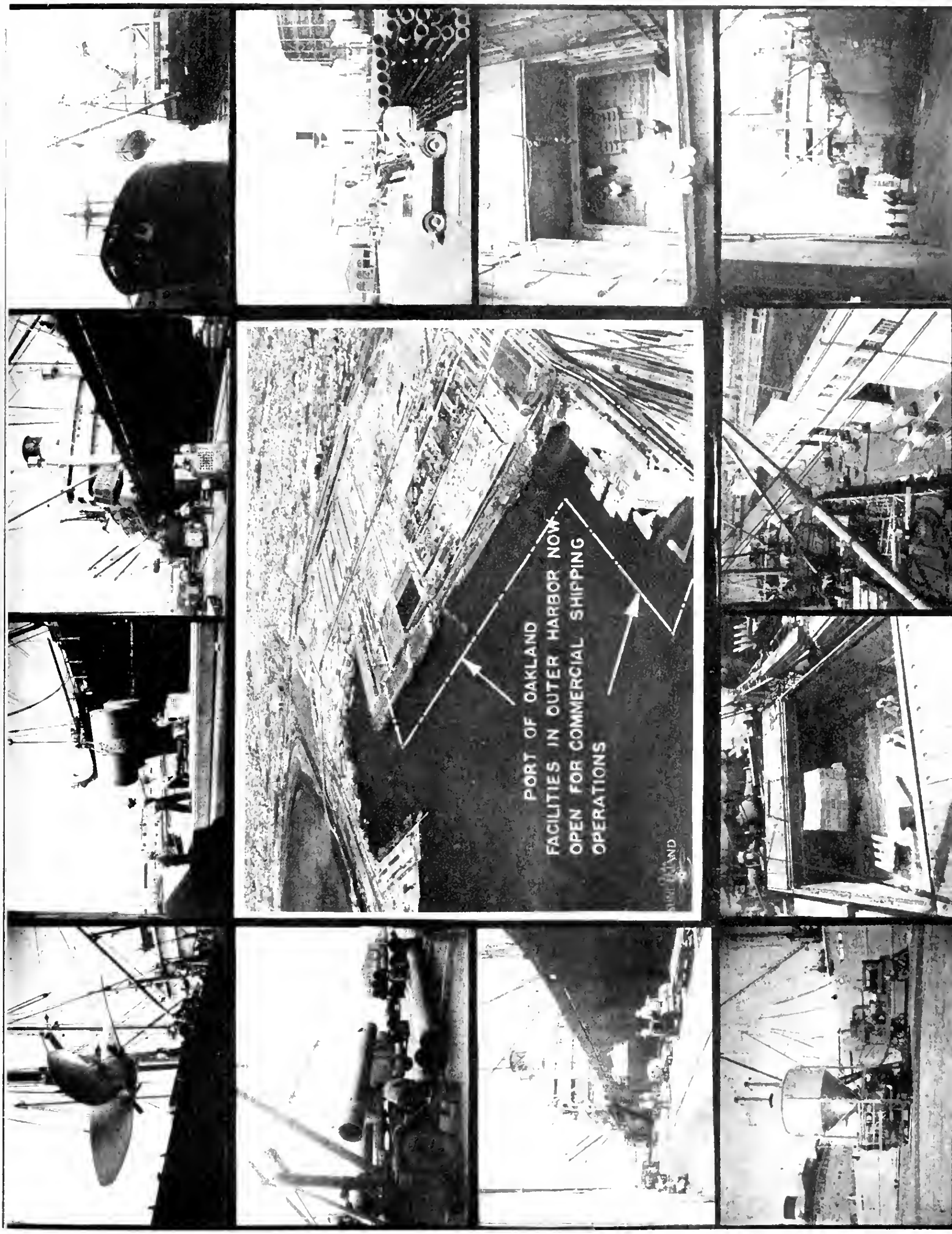
As part of the Federal Airport program, more than half a million dollars will be spent increasing and improving facilities at the Oakland Municipal Airport, as soon as funds are received from the Civil Aeronautics Administration. The Government will provide the sum of $285,000, while the Board will contribute the remainder to make up a total of $694,000 to carry on this important work to improve the air facilities of the city.

The major portion of this fund will be spent in constructing an annex to the present Administration Building at the Airport to provide additional lobby and office space for air lines and air passengers. The present building will be extended out to the present passenger gates, and increased to two stories throughout, with provision for the Airport Restaurant on the top floor.

In addition the Airport parking area will be paved from the extreme eastern end at Hegenberger Road and Doolittle Drive to a point opposite Hangar No. 4. Runway 27R will be extended approximately 900 feet at the western end of the Airport, which will make it approximately 6100 feet long and about the same length as the other east-west runway 27L. Paving in front of the Administration Building and the hangar line will be extended to provide additional areas for the operation of transport planes.

A few of the many cargo handling facilities at Oakland. ▶

Pacific World Trade


PORT OF OAKLAND
FACILITIES IN OUTER HARBOR NOW
OPEN FOR COMMERCIAL SHIPPING
OPERATIONS

Standard Oil President Addresses Junior World Trade Association

At the April 7th meeting of the Junior World Trade Association in San Francisco, T. F. Petersen, President of Standard Oil Company of California, reviewed the oil situation and answered questions for the group. It was the largest meeting the Association has ever held.

Pictures taken at Junior World Trade Meeting. Top picture shows, left to right: Edward A. Myers, Jr., and Irving V. Augur, Otis McAllister & Co.; T. F. Petersen, President of Standard Oil Co. of California and speaker of the evening; Ted Petersen, Jr.

Foreign Travel Continues

What is the effect of a critical world political situation on travel to Europe? Have Americans changed their minds about going abroad since the recent change of government in Czechoslovakia? The International Travel Department of the American Automobile Association has completed a survey which shows that interest in foreign travel remains strong, despite unsettled conditions.

Mrs. Ruth Shipley, chief of the State Department's Passport Division, has confirmed to the A.A.A. that a greater number of applications for passports were made in March of this year than during any single month since the mid-thirties.

"The trend is still upward," Mrs. Shipley says, "with the crest of a seasonal increase still not attained." A total of 26,883 passports were issued or renewed in March, compared with 20,294 in the same month of 1947. In March of 1930, a peak travel year, only 18,802 passports were issued.

Passports issued during the first quarter totalled 59,631 (with fully 75 per cent bound for Europe), an increase of 3,000 over the first quarter of 1947. Applications now are being received at the rate of 1,200 a day.

Secretary of the Treasury Snyder spoke out last week in support of increasing from $100 to $500 the exemption limit on duty-free goods American travelers may bring home from abroad. A bill for such an increase, introduced by Rep. Bertrand W. Gearhart (R., Calif.), is pending in the House Ways and Means Committee.

Addressing a Texas bankers meeting, Mr. Snyder said: "American tourist travel abroad has long constituted an important source of dollars to foreign countries . . . It is safe to anticipate that with proper encouragement the annual expenditure of American tourists abroad will rise to more than a billion dollars. If this anticipation should be realized, it would help to alleviate the world-wide dollar shortage."

General MacArthur On Private Trade with Japan

Following is the text of a telegram from General Douglas MacArthur to Dwight K. Grady, chairman of the World Trade Committee of the San Francisco Chamber of Commerce:

MY ATTENTION HAS JUST BEEN CALLED TO YOUR RECOMMENDATION THAT THE TRADE BETWEEN JAPAN AND FOREIGN COUNTRIES BE COMPLETELY RESTORED TO PRIVATE HANDS. I AGREE WITH YOU MOST HEARTILY AND HAVE PUBLICLY SO STATED. GOVERNMENTS NORMALLY HAVE NO PLACE IN PRIVATE BUSINESS. THE TRICK HOWEVER IS HOW THIS CAN BE ACCOMPLISHED WITH A DEFEATED AND OCCUPIED COUNTRY. I KNOW OF NO WAY EXCEPT THROUGH A TREATY OF PEACE WHICH I HAVE BEEN ADVOCATING FOR MORE THAN A YEAR AND WILL WELCOME YOUR SUPPORT.

MACARTHUR

Withdrawal of SCAP (Supreme Commander for the Allied Powers in Japan) from private trade was urged April 28, by the Board of Directors of the Chamber. Board action followed recommendation by the World Trade Committee headed by Grady.

At that time, Grady said: "SCAP commercial activities are an unnecessary interference with private trading operations and retard Japanese-American trade resumption and expansion."

The San Francisco Chamber in July, 1947, urged Secretary of State George C. Marshall to hold the Japanese Peace Conference in San Francisco. The Chamber was later advised by the State Department in March, 1948, that because of lack of agreement between interested countries it is unlikely that the Japanese Peace Conference will be called in the near future.

No More Export Declarations On Alaskan and Hawaiian Shipments

Export declarations on shipments between the Mainland and Hawaii and Alaska no longer need to be filed. President Truman has signed H. R. 3229, making effective a measure exempting those two territories from the Cargo Manifest Law.

Since 1902 a law has been in effect requiring declara-

tions on shipments to and from these territories. Firms in the Hawaiian and Alaskan trade have been successful in thus obtaining relief from the law, in effect since 1902, which required export declarations on shipments to and from these territories, and the preparation of which has been tedious, difficult and costly.

World Trade Week Observance In Metropolitan Oakland, California May 16-22, 1948

An elaborate and comprehensive program has been arranged for the week of May 16 to 22 in Oakland, when this area will join with the nation in observing annual World Trade Week.

Through the cooperation of the World Trade Committee of the Oakland Chamber of Commerce under the chairmanship of Walter G. Perker, and the Oakland Foreign Trade and Harbor Club under the presidency of Wallace B. Worswick, Oakland's Week calls the importance of World Trade to the residents of this city more pointedly to their attention. Included in the program are special observances by civic, service and trade organizations, with some 35 groups in Oakland and Alameda County taking part.

The Week opens with a luncheon meeting of the Oakland Kiwanis Club on Monday, May 17, with four foreign students from the International House, University of California, featured as speakers. Tuesday opens with an International Aviation Day Breakfast at Oakland Airport, featuring complimentary flights over the Bay Area in air liners used in the trans-Pacific services.

The Oakland Traffic Club and Oakland Foreign Trade and Harbor Club will jointly sponsor the annual World Trade Week Dinner on Tuesday evening at Leamington Hotel; and on Wednesday, the Oakland Lions Club will observe the Week with a talk by Maitland S. Pennington, Vice President, Pacific Transport Lines, at their Leamington Hotel luncheon.

Highlight of the Week's observance will be the annual International Banquet and Dance honoring the entire Consular Corps of the San Francisco Bay Area, at the Claremont Hotel.

Officers and cadets of the training ship *S.S. Golden Bear*, returned from their mission of mercy to Europe, will be honored by the Oakland Chamber of Commerce and Oakland Rotary Club on Thursday noon at a large civic luncheon in the Leamington Hotel. The staff of the California Maritime Academy will be honored guests.

Friday will feature a special World Trade Week Open House at the Oakland Naval Supply Center—the world's largest—at which time the entire facilities of the base will be open to the public.

As a special feature, the Oakland Board of Education, which works with a continuous World Trade Committee throughout the year, will give special emphasis during the week of May 16-22 to world trade, in art, dancing, music, foods, journalism, science, languages, history and economics classes.

In addition, the Oakland Public Library has again published a large bibliography relating to World Trade and will call attention of the public especially to such books during the Week's observance.

March Meeting of Foreign Trade Association Of Southern California

At the March 4 meeting of the Foreign Trade Association of Southern California, William Brumbach, manager of sales for Hallett Manufacturing Company, who recently returned from an extensive trip through South American countries and the Caribbean Area, told the members of his experiences and of export and import conditions in that area. Pacific Marine Review representative was able to snap some typical groups in the following photos.

Pictures below:
Top, left to right: Henry G. Bartlett, Bartlett & Boissevain; T. V. Bartelsen, Norton Lilly & Co.; William Brumbach, speaker, Hallett Mfg. Co.; S. S. Hindle, American President Lines General Agent and President of So. Cal. Foreign Trade Association; Philip Stein, Customs Attorney; John A. Sowers, World Trade Dept., Chamber of Commerce; Paul E. Pauly, Dept. of Commerce.

Center, left to right: George Yale, Yale International; Baron Otto von Strahl, Glass and Glass, Johannesburg, Union of South Africa; Edward Belford, Manager, Yale International; Russell H. Donnelly, Farmers & Merchants National Bank; Paul E. Toyree, Farmers & Merchants National Bank; W. E. Tizard, Dresser Industries, Inc.; W. B Frank, United Air Lines, Inc.; F. L. Baptie, Trans World Airline.

Bottom, left to right: F. S. Boissevain, Bartlett & Boissevain; Brae Loveless, Pacific Far East Line, Inc.; C. W. Allen, Farber & Co.; Mary Bolanos, Hallett Mfg. Co.; J. E. Bell, Pacific Far East Line, Inc.; J. V. Gargan, Interpacific Export Company; H. Hornbein, Interpacific Export Co.; Brett L. Patton.

Pacific WORLD TRADE

Marine Insurance

The London Letter

By Our United Kingdom Correspondent

Theft and Fire Damage Precautions

Marine underwriters continue to take a serious view of the theft and pilferage problem. These hazards, as Sir Arthur S. Rogers, chairman of the Standard Marine Insurance Company, Ltd., Liverpool, has just reminded us, exist in almost every country in the world, and, in some areas, "are so grave as to be a severe handicap to international trade." The continuance of the depredations is traced in part to inability to obtain efficient packing materials, also to the shortage of many essential commodities. It is regarded as a hopeful augury, however, that, following discussions at conferences of the International Union of Marine Insurance, underwriters in many of the large marine insurance markets have taken measures in an endeavor to mitigate the losses due to these risks.

Shipping companies and stevedoring firms in the Liverpool area continue to make efforts to check losses due to pilferage. Nearly 200 specially trained security guards are maintaining a day and night watch on board ships, on quaysides and in dock sheds.

These guards, the majority of whom are former seafarers or ex-policemen, are employed by an organization known as Liverpool Ship Services, which was inaugurated in 1946 and since that time has developed so rapidly that today it supplies personnel to no fewer than 48 shipping companies and stevedoring firms associated with the port. This Liverpool service is an off-shoot of a similar service which has been assisting shipowners in the River Clyde area for many years past. Another branch has recently been established in London. Plans are also in hand to begin operations in Manchester.

A more recent development has been the inauguration of a fire patrol service. For this work, the men—many of whom are former National Fire Service personnel—are trained in fire practice with special relation to fires on board ship. Day and night patrols are carried out. The shipping companies that make use of these fire guard services include the Elder Dempster Lines, members being engaged for duty on board the new passenger liners *Accra* and *Apapa* when these ships are in port.

Grain Cargoes

The directors of the North of England Protecting and Indemnity Association, Newcastle-on-Tyne—one of Britain's leading "Clubs"—warns its members that the principal disputes with which the Association is dealing have arisen in connection with Government imports of Argentine grain into Britain and abroad. As a result of the recent prolonged war and the passage of time, many of the older and more experienced shipmasters have left the service. These men have, naturally, been replaced by a younger generation, capable no doubt, but lacking in the knowledge essential in dealing with shippers and charterers, stevedores, etc., in ports of the world far remote from home advice. It is desirable, the Association states, that members, having vessels under charter to load grain in Argentina, should be careful to warn the masters of their vessels to be very watchful not only of the condition of the grain tendered for shipment, but also of its stowage and ventilation.

In other grain producing countries, including our own, the harvest periods may be, and frequently are, subject to torrential rain-storms in certain sections of the agricultural area, with the result, as in the immense area of Argentina, that the grain coming from one part, or from most parts, of the land may be dry and sound when it reaches the port of shipment, but from other parts of the land surface over which the heavy rain has passed, the grain may have been thoroughly wet and only superficially dried before it is hurried on board ship and possibly mixed with or stowed near dry grain. The above fact, the Association continues, has been markedly present in numbers of these Argentine cases with which the Association has dealt in past years and is dealing at present.

Summing up, the Association reports that many shipments from the River Plate of the new maize are anticipated. It would, therefore, be a help if members, having ships chartered to load Argentine grain could provide the master with a few small "sample bottles" which he should be advised to use if he has the slightest suspicion of there being possible, or probable, dampness in any particular parcel being loaded into his vessel. If he could take these samples, seal and properly label the small bottles and keep them against his arrival, and out-turn of cargo, they might, it is suggested, be found a very potent help in dealing with any allegations against the carrying vessel based on alleged bad stowage, etc.

The Safety at Sea Conference

About 250 representatives from over thirty countries met in London on Friday, April 23, for the opening session of the International Conference on Safety of Life at Sea. It is expected that the Conference will end in about seven weeks' time. The use of radio will be discussed—also the use of radar and direction finders. Among the other numerous subjects to be dealt with will be precautions against fire; life-saving appliances; and revision of the Collision Regulations.

Arrangements are being made for delegates to see demonstrations with sprinkler apparatus at Westminster (April 29), a display of rocket life-saving equipment at Brighton (May 14), and at a Brentford factory (May

21), control equipment for the harbor supervision radar at Liverpool. The social side includes receptions by the Government, the Port of London Authority, Trinity House, and Lloyd's Register, and dinner parties by the Government (June 2) and the Chamber of Shipping (May 25).

In welcoming shipowners and technical representatives of associations overseas, which formed, with the British Chamber of Shipping, the International Chamber of Shipping, Sir George Christopher (president of the Chamber of Shipping of the United Kingdom and chairman of the International Chamber of Shipping) said that the task of those who would be taking part in the International Conference on Safety of Life at Sea (to be held in London from 23rd April until 11th June), for the purpose of revising the 1929 Convention, was of the highest importance. They were obviously faced with a formidable task, but he was sure they would bring to bear the acid test of keen practical experience upon the numerous proposals, in regard to some of which they might well have to judge carefully between "the idealistic and the practical."

Sir George Christopher further stated that it was over 25 years since the International Chamber of Shipping (then the International Shipping Conference) first took the initiative in preparing for safety requirements after the first world war, and appointed a series of expert committees to frame proposals for submission to the Governments. It took nearly 7 years to work out those proposals, and it was just 18 years since the Safety Convention was last revised.

Mine Casualties

Figures published by "Lloyd's List," London, show that mine casualties to vessels of over 500 tons gross, in the first 3 months of 1948, numbered 11. Seven vessels of under 500 tons gross were also lost or damaged from the same cause, increasing the three months' total to 18 mine casualties. This compared with 16 such casualties in the preceding 3 months, including 8 vessels of over 500 tons gross. Of the March quarter's casualties to vessels of over 500 tons, six occurred in North Sea and Baltic waters, and five casualties took place in the Mediterranean. The quarter's mine casualties to ships of over 500 tons gross involved 3 Norwegian vessels, two American, and one each British, Dutch, Swedish, Italian, Greek and Russian.

Navy Sinks Mines in Shipping Lane

Two floating mines sighted on the regular San Francisco-Honolulu steamship route were destroyed by gunfire from the large Navy transport, *General J. C. Breckenridge,* which docked here recently.

The mines, similar to those washed ashore here recently, were spotted 990 and 545 miles from the Pacific coast and were sunk by 40 and 20 millimeter gunfire.

The first mine sighted exploded with great intensity, according to Captain J. E. Florence, USN, skipper of the *Breckenridge,* and constituted a threat to large ships. The second mine sank without detonating.

Captain Florence said the mines probably had broken away from moorings in Japanese home waters and appeared to have been adrift over a long period.

Home Insurance Expands

The Home Insurance Company, New York, due to necessity for additional space has found it necessary to move their Pacific Marine Department to completely modernized new quarters at 565 Clay Street, San Francisco.

We learn from Co-Marine Managers, Clayton Roberts and Alberto Martinez, Jr., that this centralization of the entire Marine Department with all of its various departments under one roof will permit more efficient and proper handling of the company's Pacific Marine Department's operations.

There is no change in the telephone number—it will still remain EXbrook 2-5600.

Clayton E. Roberts and Alberto Martinez, Jr., co-managers, Home Insurance Company, Marine Dept., at San Francisco.

Admiralty Decisions

By HAROLD S. DOBBS *of San Francisco Bar*

ASSAULT AT SEA

I have always been of the opinion that all courts and particularly those dealing in admiralty matters, rightfully should take judicial notice of the natural tendency of seamen to settle and adjust their personal differences by committing an act of assault, battery or both upon other seamen where the facts disclose that an assault or battery, or both, occurred aboard ship during the course of or immediately prior to the end of a long voyage where the seamen involved, as well as the remainder of the crew, have been caused to live in rather intimate fashion with one another over a considerable period of weeks or months.

From my experience in dealing with cases of this kind, I have concluded, even though sympathetically, that "boys will be boys," as the expression goes, and when the situation presents itself, seamen in general will settle their personal differences in the manner indicated. It seems only natural that seamen will find reasons for disagreeing with other seamen about personal matters and also subjects far afield of the ship's business during the course of a voyage in which circumstances are such that the only appropriate medium of settlement is the use of force, resulting in assault or battery or both.

Countless claims and admiralty suits have been filed in years past in which the courts have been asked to determine whether or not the assaulted seaman has a cause of action against the vessel's owner for damages where the assault or battery is alleged to have been inflicted by some other crew member or officer while engaged in ship's business. The issue in each case is simply whether or not the assault, battery, or both, arises out of some argument over ship's business. It has been the practice of libelants and plaintiffs alike, in bringing such suits, to allege that the seaman or officer accused of assault or battery was of a vicious, pugnacious and dangerous disposition to the knowledge of the shipowner, or on the other hand, that the claim is one for negligence on the part of the shipowner in employing fellow crew members and officers who by some act have negligently assaulted or battered another seaman or officer while such seaman or officer was engaged in carrying out ship's business. Most of these cases necessarily are determined upon the question of credibility because in each case there is usually a conflict as to who hit whom first and why.

In a case decided by the United States District Court of the Southern District of New York in January of this year, entitled *Kable vs. United States of America, etc.,* the libelant, chief officer of the Steamship *George Vickers,* sought damages for personal injuries alleged to have been sustained as the result of an assault committed upon the libelant by one Erik Svedman, chief engineer, while the vessel was lying at the Port of Alexandria, Egypt. Claims were also made for maintenance, unpaid wages and damages for failure to pay wages. The usual ground of liability was asserted in the libel, namely, that Svedman, the chief engineer, was "of a vicious, pugnacious and dangerous disposition" to the knowledge of the respondent, United States of America.

The testimony of the chief officer and the chief engineer as well as that of the second mate and second assistant engineer, when taken together, was without semblance of being a description of one and the same thing. A careful reading of the testimony of all parties concerned, however, made it clear that there was no evidence to sustain the contention that Svedman, chief engineer, was of a vicious, pugnacious or dangerous disposition.

The court quickly disposed of the libelant's first claimed ground of liability on the ground that the United States had employed a vicious person in the position of chief engineer.

The facts briefly stated are that Mr. Kable, the libelant, accompanied the chief engineer ashore on the night upon which the assault and battery occurred and during the time that they were ashore were caused to argue about some personal matter, after which they separated, each returning to the ship at a different hour. Later, Kable went to the chief engineer's quarters, demanding in loud and boisterous manner that he be admitted immediately. Upon gaining admittance, Kable ordered the chief engineer to put ashore two British Naval officers who were then being entertained by the chief engineer, to which the chief engineer refused. On behalf of Kable it might be said that port rules forbid the ship's crew bringing guests aboard except on business. In any event, a fight ensued between the chief engineer and Mr. Kable, during which time the chief engineer was severely beaten about the head. Kable's superiority was accomplished by the use of the butt end of a gun he was carrying. The chief engineer was injured rather severely. About an hour later, the testimony of witnesses showed that Svedman and Kable engaged in a further encounter at which time Kable received the worst of the fight.

The court held that the attack by Svedman, chief engineer, in the second encounter, did not constitute negligence because it was not in furtherance of the master's business, for which the respondent, United States of America, would be liable in damages.

The libelant, in support of his case, referred to many cases in which the shipowner was made to respond in damages on grounds of negligence because of physical attacks by fellow crew members and officers alike. However, each of the authorities cited was and is completely answered by the case of *Brailos vs. Shepard SS Co.,* where the facts indicate the first assistant engineer, in the course of an argument, stabbed the chief engineer, and the chief engineer sought to hold the shipowners

liable for negligence.

In affirming a jury verdict in favor of the defendant shipowner, the Circuit Court of Appeals stated as follows:

"An assistant engineer can hardly be said to act in furtherance of his master's business when he assaults the chief engineer as the latter attempts to take control at a time of emergency. The case on its facts is clearly distinguishable from cases relied on by the plaintiff where a superior officer injured a seaman in the act of prodding him to work."

In the present case, the most that can be said for the libelant's contention is that the chief engineer attacked the libelant in a second encounter in retaliation for the libelant's prior assault upon the chief engineer in attempting to enforce the port regulation. The court held that the attack was not in furtherance of the master's business, and therefore no liability follows.

Kable's claims for maintenance, cure, unpaid wages and damages for failure to pay wages were disposed of upon the ground that he was the aggressor and therefore guilty of wilful misconduct.

This case represents a typical situation where the circumstances surrounding the assault and battery point to ship's business and liability of the shipowner, but which in reality are simply the settlement of personal and private differences in nowise related to the ship or its business except that the assault and battery occur in or about the ship.

"In Rem" Proceeding Against United States Bareboat Vessel Held Nullity

By statute, no vessel of the United States may be subjected to an "in rem" proceeding. By "in rem" I mean simply the right to bring an action directly against the "thing", which in cases of this type is the ship. Ordinarily, of course, it is quite common to bring an action against a ship by virtue of "in rem" jurisdiction.

In the case of *Alaska Steamship Company vs. American-Hawaiian Steamship Company and Steamship Fenn Victory*, recently decided before Judge Bowen in the United States District Court for the Western District of Washington, the American Steamship *Fenn Victory*, owned by the United States Maritime Commission and leased under bareboat charter to the American-Hawaiian Steamship Company, collided with a vessel of the Alaska Steamship Company. The latter, libelant in this case, filed a libel "in rem" against the *Fenn Victory* and caused the United States Marshal to arrest her. The American-Hawaiian Line, desiring to sail the vessel without delay, furnished a stipulation upon which the Marshal released her. Subsequently, the American-Hawaiian Line moved by procedure of motion to raise the question of jurisdiction.

After appropriate evidence had been introduced, the court said in part:

"By reason of the Suits in Admiralty Act, the proceeding 'in rem' in this case against the *Fenn Victory* from the beginning and at all times material to this action has been void and of no effect, because under the provisions of that Act this court has not and cannot have any power judicially to proceed 'in rem' against that merchant vessel of the United States."

The court reasoned that the Suits in Admiralty Act prohibited judicial seizure and further that the Act failed to make any exception by reason of private operation of Government vessels under bareboat charter.

As indicated, the American-Hawaiian Steamship Company had previously furnished a bond by stipulation for the release of the vessel so that it might continue on its voyage without further delay.

With respect to the stipulation for value and for costs, the court said that the stipulation for value was a nullity like each and all of the other things which were done in connection with the "in rem" proceeding. As a result, therefore, the bond was ordered returned and the proceeding dismissed. The ship had, of course, already continued on its way.

Judge Bowen's decision clears the maze of cases that have reached a like result by implication, but have failed to adequately establish the point so that it might be relied upon and referred to as authority for the proposition in issue.

Supreme Court Denies Certiorari in Shilman Case

Last month I reported the case of *Shilman vs. the United States of America and Grace Line, Inc.*, in which the libelant (seaman) sought recovery of two hundred dollars in wages earned by him as a member of the crew of the merchant vessel *Eli Whitney*. In the lower court, judgment was rendered in favor of the respondent.

While the vessel, upon which libelant was employed, was in the Port of Tunisia, North Africa, then an active theater of war, libelant was arrested by personnel of the United States Army for stealing an adding machine from the office of the French Navy. He was tried before a Special Court Martial, found guilty and sentenced to pay a fine of two hundred dollars to the United States in addition to serving a prison sentence. He served his prison sentence but never paid the fine.

The ship's agent, Grace Line, deducted the fine of two hundred dollars from the money due him at the time payment was made.

The Circuit Court of Appeals reversed the decree of the lower court insofar as it applied to the United States and affirmed it as to the agent, Grace Line. Certiorari was denied by the Supreme Court on February 16, 1948. The United States, as employer of a merchant seaman, may not deduct from his wages an unpaid Army Court Martial fine for the reasons set forth in my earlier article. As far as the agent is concerned, he is not the employer of the seaman in such sense as to be responsible to him for making a deduction from his wages of an unpaid Army Court Martial fine. If the agent had failed to disclose the agency, a different result might have followed.

Pre-Historic Rope

Cordage was one of primitive man's first tools. Long before he learned to spin or weave, he twisted sinew, hair, vines and other plants into rope for snares, nets and fishlines, according to the Columbian Rope Company.

GOLDEN BEAR

(Continued from page 61)

had accomplished its assigned mission—"Deliver the goods."

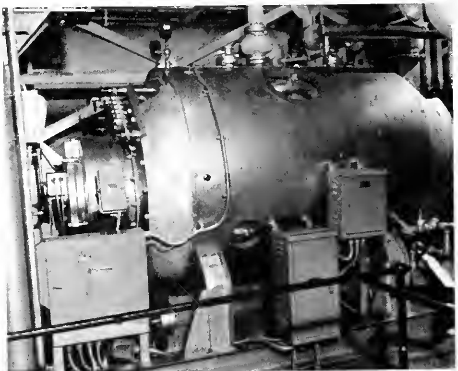
The *Golden Bear* was manned entirely by the officer-instructors of the Academy and by the midshipmen, except for the steward's department and the ship's laundry. Every officer in the Deck Department is a graduate of the California Maritime Academy and all of them hold master's licenses. Almost all of the officers hold commissions in the Naval Reserve and served in World War II. The midshipmen, entering at ages 17 to 23, are enrolled in two groups, Deck and Engineering, for a three year course, of which a total of approximately one year is spent at sea on three foreign training cruises of four months each. The remainder of the course is spent in classroom study and practical drills at the State Academy on Morrow Cove, Carquinez Straits, near Vallejo. The graduates receive a Bachelor of Science Degree in Nautical Science, specifying either Seamanship and Navigation, or Marine and Electrical Engineering, according to whether enrolled for Deck or Engineering training. Final graduation examinations consist of sitting for licenses as third mates or third assistant engineers. In addition, graduates receive a commission as ensign in the Merchant Marine Naval Reserve, and a commission as ensign in the U. S. Maritime Service. Admission to the Academy is by competitive examination. The current enrollment of 99 midshipmen is expected to increase to 150 with the class entering September 1, 1948.

The *Golden Bear* will take a prominent part in National Maritime Day Ceremonies in San Francisco on May 22, after returning from her historic cruise on May 19. She will be berthed at Pier 5 and will be open for public inspection from 1:00 p.m. on May 20, 21 and 22. The midshipmen will provide the honor color-guard, bugler and firing squad for the Golden Gate Bridge ceremonies honoring members of the Merchant Marine lost in World War II. The entire Corps of Midshipmen will take part in the down-town parade for which Fleet Admiral Nimitz has accepted the role of Grand Marshal. The *Golden Bear* has been designated as the Flagship for National Maritime Day and it is hoped that the completed shipping documents for the good-will cargo delivered to Europe can be presented to Governor Warren in a public ceremony.

The *Golden Bear* will visit San Diego from May 11-13, Long Beach May 13 to May 15 and Santa Barbara May 16-18.

ADDITIONAL PICTURES OF CHESSMAN

(See pages 62, 63 and 64)



Opposite, top: "Cyclotherm" steam generator, furnished by Consolidated Services, Seattle.

Opposite, bottom: Auto Deck of the Chessman. Albina's architects were particularly proud that the only protuberance from the engine room is the main hatchway (center).

Accident Prevention Bureau 1947 Contest Winners

The Waterfront Employers' Association's Accident Prevention Bureau announces that the winners of the Byron O. Pickard Memorial Trophies for 1947, the third year of a five year contest have been determined. The awards are based on the cumulative compensable injury frequency rate rather than on the experience of a single year. The minimum total manhours for offshore are 200,000, for onshore 150,000 and for terminal companies 100,000. Smaller companies can become eligible over a period of years when they have accumulated sufficient manhours to produce a significant frequency rate.

The 1947 winners and the sponsors of the trophies in the several contests are listed below. An asterisk indicates that the company has won for two years while a double asterisk indicates three-time winners.

Coastwide

Offshore—**Matson Terminals, Inc., Los Angeles. General Steamship Corp., Ltd., Trophy.

Onshore—Brady-Hamilton Stevedoring Company,

Portland. The Log Trophy.

Terminal—*Howard Terminal, Oakland. East Bay Terminal Companies' Trophy.

Columbia River District

Offshore—Luckenbach Steamship Company. Employers' Mutual Liability Insurance Company of Wisconsin Trophy.

Onshore—*Brady-Hamilton Stevedoring Company. Pacific Marine Review Trophy.

Terminal—Commission of Public Docks. Marine Electric Co., Northwest Marine Iron Works, Steckmest & Company Inc., Albina Engine & Machine Works Inc., Willamette Tug & Barge Company Trophy.

Puget Sound District

Offshore—*W. R. Grace & Company. Todd Shipyards Corporation Trophy.

Onshore—Matson Terminals, Inc. Pacific Marine Supply Company Trophy.

Terminal—*Shaffer Terminals, Inc. Marine Lumber Services, Inc. Trophy.

San Francisco District

Offshore—**Jones Stevedoring Company. C. J. Hendry Company Trophy.

Onshore—*San Francisco Stevedoring Company. Fireman's Fund Insurance Company Trophy.

Terminal—**Howard Terminal. East Bay Terminal Companies' Trophy.

Southern California District

Offshore—**Matson Terminals, Inc. Pacific Employers' Insurance Company Trophy.

Onshore—*Metropolitan Stevedore Company. The Bilge Club Trophy.

Mrs. Homer Sponsors Big Ore Carrier

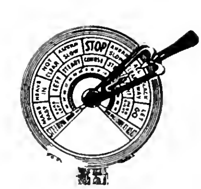
When the 24,000-ton ore carrier *Cubore* was launched recently at Bethlehem Steel Company's Sparrows Point Yard, the sponsor was Mrs. Arthur B. Homer, wife of the company's President. She is shown below on the launching stand with, left to right, H. W. Warley, President, Ore Steamship Corporation, for which the vessel was built; Mr. Homer, Mrs. H. C. Crawford, wife of Bethlehem's Vice-President, Traffic; Mrs. J. W. Larkin, wife of Bethlehem's Vice-President, Industrial and Public relations; and Messrs. Larkin, Crawford and Norborne Berkeley, Bethlehem Vice-President.

Mr. Homer announced at the launching that the new shipbuilding program for the Sparrows Point Yard includes four tankers of 18,000 deadweight tons for foreign interests and a minimum of three 28,000-ton oil tankers, two being for a domestic oil company and one for foreign interests. He pointed out that these tankers will be larger than any now in service, and added that two further ships in this class may be authorized.

The *Cubore* is the seventh of eight 24,000-ton ore carriers being built at Sparrows Point for the Ore Steamship Corporation, a subsidiary of Bethlehem.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

The Solution of the Right Spherical Triangle By Use of Napier's Rules

In the past several years this writer has had the opportunity of contacting many navigators, most of them excellent in their field. However, it has been his experience to find that, even though these navigators have encountered no difficulty in determining the position of their vessel or of conducting it from one position to another on the surface of the earth, they knew little of the theory upon which the "short form" tables were based. They had learned "by rote" to look in these tables, following a given set of accompanying rules, and come out with the answer to their Spherical Triangle problem.

The purpose of this article is to try and broaden the scope of understanding of what the present day navigator is doing when he solves his Spherical Triangle problem by means of these short forms, thus enabling him to develop his own formula for the solution of his spherical triangle when faced with a situation where the short forms are not available or when conditions are such that the more convenient forms are not easily adaptable to the case. Aside from the possible necessity of this knowledge, it is the opinion of this writer that every conscientious navigator should and will, in justice to himself and his profession, avail himself of each opportunity to increase his knowledge of his field thereby making himself more valuable to his employer and benefiting the entire industry. Who knows, such knowledge might someday save the lives of men, a ship and its cargo or both.

Navigation is not by any means a new art or science and surely the solution of spherical triangles upon which most of our offshore navigation is based is not new. We merely have some newer and shorter ways of doing the same old thing.

Somewhere near the beginning of the seventeenth century a Scottish mathematician, John Napier, the inventor of logarithms, developed certain rules and formulae for spherical trigonometry. Some of these have since come to be known as Napier's "Rules of Circular Parts" or in short "Napier's Rules." These rules are what we are interested in as far as this article is concerned. They are as follows:

RULE I: The sine of the middle part is equal to the product of the tangents of the adjacent parts.

RULE II: The sine of the middle part is equal to the product of the cosines of the opposite parts.

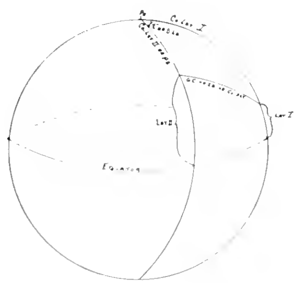
In the solution of the right spherical triangle by these rules, there are three other facts which must be considered.

1. The 90° angle is ignored (thus leaving five parts—the hypotenuse, the other two angles, and the two sides adjacent to the 90° angle).
2. The complements of the hypotenuse and the two angles must be used.
3. Any part may be used as the middle part.

The mastery of these rules and facts requires but a little study and then some practice after which the development of your own formulae for the solution of the right spherical triangle is quite simple. These rules are equally applicable to either Terrestial or Celestial Spherical Triangles if we remember that Great Circle Distance on the earth and Zenith Distance on the Celestial Sphere are the same when measured in arc. However, in our Celestial Navigation we are concerned with the altitude of a body rather than its Zenith Distance (which is the complement of the altitude) in order to get our altitude intercept. For the solution of our Terrestial Spherical

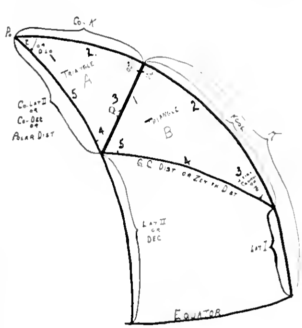
Triangles we are concerned only with the Great Circle Distance.

As will be noticed we have been referring to the solution of right spherical triangles while we as navigators know that most of the spherical triangles we solve are not right spherical triangles. Napier's method of overcoming this obstacle in most cases was to erect a perpendicular to the meridian of the observer at a point where it would intersect the body, in celestial navigation, or where it would intersect the position of the destination for great circle sailing, thus creating two right spherical triangles. In the accompanying Sketch 1. we see illustrated the spherical triangle while in Sketch 2. we see approximately this same triangle on a larger scale with the perpendicular (R) erected giving us Triangle A and Triangle B showing the 90° angle and numbering the remaining five parts.



Sketch 1

To simplify and more clearly illustrate the use of Napier's Rules let us give values to some of the parts of the sketch and solve the triangle. Let us assume that from a position in Lat. 17° 21′ 15″ N., Long. 25° 31′ 30″ W., we observed a star whose declination was 44° 29′ 30″ N. and whose G.H.A. at that instant was 63° 28′15″ W. By applying our Longitude to the G.H.A. we get 37° 56′ 45″ as the meridan angle west thus giving us three known values with which to solve our triangle.



Sketch 2

Before starting with the actual steps of the solution perhaps it is best to give names to other parts of the triangle as shown in Sketch 2. First K is the name given to the distance from the Celestial Equator to the point where the perpendicular (R) intersects the observer's Celestial Meridian. Second, Co-K is the name given to the distance from the point to the Pole. Third, K plus or minus Lat. is the name given to the distance from the observer's Zenith to the point of intersection of (R) with the observer's meridian. It is perhaps worthwhile making note of and remembering that:

1. It is advisable when posible to use the known values as the middle part.

2. Since we must use complements of the hypotenuse and the two angles let us keep in mind that—Cosines are complements of sines and that cotangents are complements of tangents.

Now for the problem.

Lat.	17° 21′ 15″ N.
Dec.	44° 29′ 30″ N.
Meridian angle	37° 56′ 45″ W.

First Triangle A of the Sketch:

Step 1. Using the meridian angle as the middle part and remembering that we must use the complements of the angles and the hypotenuse we can develop the formulae;

Sin Co-Meridian angle equals tan Co P.D. multiplied by tan co K. or

Cosin Meridian angle equals tan Dec. multiplied by tan Co K so

Cos Meridian angle divided by tan Dec. equals tan Co K. Using Logarithms we add logs to multiply and subtract logs to divide thus giving us—

Log Cos Meridian angle minus Log tan Dec. equals Log tan Co K

Log Cos Meridian angle	9.89686
Log tan Dec.	9.99230
Log tan Co K	9.90456

The value of Co K is 38° 45′ 16″

Subtracting Co K from 90° we find the value of K—

90° 00′ 00″
Co K 38° 45′ 16″
K 51° 14′ 44″

Then subtracting the Latitude from K, we find the value of K (plus or minus) L

K 51° 14′ 44″
Lat. 17° 21′ 15″

K (plus or minus) L 38° 53′ 29″

Step 2. Using the co Dec. as the middle part and Co K as one opposite part, we find the value of R the other opposite part by developing the following formulae:

The Sin of the Complement of Co. Dec. equals Cos Co K multiplied by Cos R or

Sin Dec. equals Cos Co K multiplied by Cos R so

Log Sin Dec. equals log Cos Co K (plus) log Cos R so

Log Sin Dec. minus log cos Co K equals log cos R

Log Sin Dec.	9.84559
Log Cos Co K.	9.89200
Log Cos R	9.95359

The value of R 26° 01′ 10″

Now for Triangle B of the Sketch:

Step 3. Using Zenith Distance as the middle part and

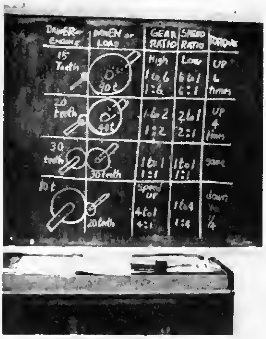
(Please turn to page 107)

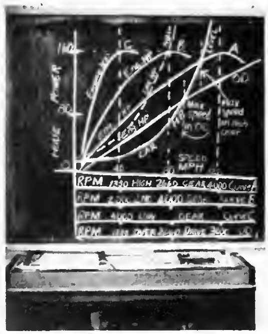
Your Problems Answered

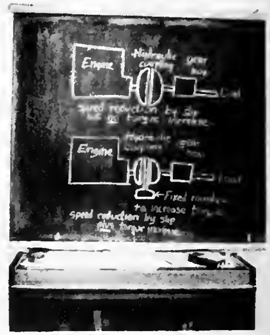
by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

"CHALK TALKS" ON APPLIED MATHEMATICS







The Automotive Gear Ratio

WE HAVE already discussed the importance of correct gear ratio and its meaning. We have decided to refer to this as the SPEED RATIO. We found that there is only one correct value of speed ratio between an engine or prime mover and the driven load. More correctly we should say that each load condition requires its own speed ratio to give maximum efficiency or maximum effectiveness of the power supply to the load. The load must run at its required speed and the engine must run at its proper speed to develop the required power.

This condition is nicely illustrated in the management of the small Naval auxiliary ships such as tugs and special assignment ships which have direct current electric drive. The electric drive is so arranged that an adjustable speed ratio is available by setting the d-c generator and motor fields at a proper value. In this way the necessary horse power can be delivered to the shaft at a shaft speed determined by the corresponding ship's speed and at the same time one or more engine-driven generators can be run at a speed to give the necessary power, yet to give long life to the engines. Here it is customary to slowly and in very small steps increase the speed ratio thus slowing down the engine but increasing the torque until the engine governor has opened the throttle nearly wide open and a full oil charge is injected at each power stroke. This slow speed lengthens

engine life and reserves higher speeds for full power output. Half rated speed is considered minimum engine speed.

On the other hand, with steam turbine drive it is desirable to maintain full design speed at all loads from no-load to full-load. This maintains the maximum efficiency of the steam end. At reduced loads we usually require reduced speeds and therefore we desire a large number of speed ratios subject to easy and reliable adjustment. Aside from the d-c electric drive no reliable and efficient adjustable speed ratio mechanism has been developed, and even with this drive we are limited in horse power size to a few thousand. 10,000 HP in d-c drive would be exceptional.

The problems in the drive of the automobile or truck also illustrate the need of a large selection of speed ratios available to the driver. For simplicity and cost the number is usually limited to three regular and perhaps one over drive forward and one reverse. Trucks may have six and more because of the fact that they have so much less horse power per pound weight.

The blackboard sketch on the left is intended to tabulate the meaning of gear ratio and speed ratio and to show the changes in torque. Note that HIGH gear ratio means high torque but that HIGH SPEED ratio means high speed. There seems to be no standard way to write the fraction which is the ratio. It may be 6 to one, written 6:1 or it may be one to six, 1:6. The customary way seems to be to express the largest number of the ratio first; thus the ratio at the bottom of the speed ratio column would be 4:1 instead of 1:4 as shown. We suggest that in expressing ratios of gears the words "Speed-UP" be used after the ratio which will clear up any misunderstanding, when the driven shaft runs faster than the driver.

The center sketch on the blackboard is an attempt to show the horsepower change with the change in speed and at the several speed ratios avaliable in the modern automobile. We have two types of curves on this graph, each marked. Note first the HP requirements of the car at the different speeds. The solid curve is marked "Car HP Level." Read the speed in miles per hour, MPH on the abscissa, horizontal axis of the graph. The dotted curve is marked "Car HP Hill." Notice that for the same speed in MPH that more HP is needed when the car is on a hill. This is a condition not encountered at sea on ships except that sometimes extreme weather, head winds and seas may give us a curve more like the hill curve than the level one. A foul bottom will give us a slight tendency toward the Hill curve for the ship.

All the other curves on the center blackboard sketch cover the maximum engine capacity at the several speeds. These are marked Engine HP. There is really only one Engine-HP curve but it is redrawn several times using a different scale on the horizontal axis so that in the several speed ratios of the car, the engine speed in RPM will coincide exactly on the horizontal axis with the corresponding car speed in MPH. Thus in high gear curve A applies and the engine is making 2660 RPM when the car is going 80 MPH. Or in second gear the engine turns 4000 RPM at 80 MPH and this is the maximum speed the engine will turn over. This is shown on curve B. Similarly Curve C is for low gear and maximum engine speed of 4000 RPM gives us only 40 MPH.

If these curves are properly drawn so that the engine speed corresponds to the car speed on the same point on the horizontal axis, then we may conclude that where the car speed curve crosses, the engine speed curve represents the speed and horse power at which we operate with the throttle wide open, and the car is the only restraint on the engine. And at less speeds where the car curve is below the engine curve we may conclude that we must throttle the engine to reduce the HP to that required by the car or else we will accelerate upward in speed until the car curve comes up and crosses the engine curve. We could, of course, have drawn many more engine curves, one for each position of the throttle, but the graph would then be much more complicated. The engine curves are shown only for the wide open throttle.

The curve for overdrive gear ratio is marked OD. Here 3000 RPM of the engine gives 120 MPH. But at this car speed the required HP is greatly in excess of that available from the engine at its speed of 3000 RPM. Thus we would never be able to come up to this speed. If we drop back into high gear, however, and allow the engine to come up in speed, then we could develop enough power to bring the car up to about 100 MPH. This is the maximum speed we could make with this combination of engine and gears. If we were to go to a little lower speed ratio and let the engine climb up in speed a little we would gain a little in car speed, but not much, as the maximum HP on curve A would only give about 105 MPH as shown in the curves.

Notice that on the "Hill" curve we could not make the hill in any speed in overdrive, as the Hill curve is above the OD curve at all speeds. In high gear, once we got started and above 20 MPH, we could make the hill curve up to about 60 MPH but if we will drop back into second gear, curve B, we could pull up to 80 MPH which gives maximum HP output from the engine.

This then explains some interesting experiences many engineers have had in driving the modern cars with overdrive. We found we could go faster in high gear than in overdrive and that with any hill or head wind we were better off in high gear than in overdrive, that overdrive was useful only at moderate speeds and on the level. We conclude then that overdrive is not the speed ratio for maximum output but is for slowing the engine down when we do not need full HP output.

Another interesting variant in the automotive field is the hydraulic clutch and the speed torque relationships. The sketches on the right show an engine with a liquid or fluid clutch and a gear box. In the sketch at the top the output from the clutch cannot be more than the input torque can be at reduced speed, and the clutch acts as a slipping device delivering less speed out and no more torque than the input. Thus the HP output is less than the input by the ratio of the speed reduction and the reduction is a loss in HP which shows up in heating of the clutch. Therefore, it is not used for continuous speed reduction, and needs the associated gear

(Please turn to page 106)

On the Ways

New Construction — Reconditioning — Repairs

Bethlehem Repairs Survey Vessel "Pioneer"

By CHARLES L. TOBIAS,

Production Supervisor, Bethlehem Steel Company,
Shipbuilding Division, Alameda Yard

Although their work is seldom publicized and they are often forced to carry on operations under extremely hazardous conditions, men of the United State's Coast & Geodetic Survey Division of the Department of Commerce are daily performing a vital service to their government by accurately charting thousand of square miles of ocean waters surrounding the United States and its island possessions. The accurate data gathered from vessels operating in this service forms the basis on which this government's modern hydrographic charts are developed.

Whereas not so long ago contours of the ocean floor were charted by means of a lead line, nowadays the U. S. Coast & Geodetic Survey employes the most up-to-date electronics equipment. When a survey vessel is in operation, a fathometer draws a continuous graph of the ocean bottom beneath her hull, while other electronic equipment known as "shoran" simultaneously furnishes precise position of the vessel. This is a peace time adaptation of the equipment used during the latter part of the war for the blind bombing of enemy targets.

The U. S. Coast and Geodetic Survey vessel, Pioneer, on drydock at the Alameda Yard of Bethlehem Steel Company, Shipbuilding Division.

One of the largest Coast & Geodetic Survey vessels, the *Pioneer*, which last summer charted over 12,000 square miles of treacherous Aleutian waters, recently went in drydock at the Alameda Yard of Bethlehem Steel Company, Shipbuilding Division, for repairs and alterations prior to returning to the Aleutians to resume survey work.

The *Pioneer* was built in 1943 at the Lake Washington Shipyards in Seattle, Washington, as a Navy AVP. Before completion, she was converted to an AGP and commissioned as the *Mobjack* in October of that year. She is 310 feet long and powered by four 1600 hp diesel engines. For two years, she saw combat duty in the Southwest Pacific as mother ship for one or more squadrons of PT boats, assisting in many landing operations, including those at Tulagi and Leyte.

In August, 1946, the *Pioneer* was recommissioned as a U. S. Coast & Geodetic Survey vessel under the command of Capt. F. S. Borden. Captain Borden, who has seen 36 years of service, will retire in the near future, transferring command to Comdr. H. E. Finnegan, who has been Executive Officer of the *Pioneer* since transfer of the vessel from the Navy.

The largest vessel ever to be drydocked at this yard, the underwater portion of her hull was sandblasted and given three coats of anti-corrosive paint and the entire hull one coat of hot plastic paint. All sea valves were overhauled, the vessel's two tailshafts were inspected and weardown recorded. Three new transducers for the fathometers were installed while the *Pioneer* was on drydock.

Other features of the work performed by the Alameda Yard include the installation of a new interior campanionway from the berth deck to the main and boat decks to facilitate access to the much used Navigating and Electronics Departments. Largest part of the job on the *Pioneer* was the extension of the boat deck over-

hang aft from frames 116 to 132. This also involved the relocation of the vessel's "working boats" and hydrographic launches after the overhang extension was completed, and the installation of a new watertight hatch on the boat deck aft to expedite the loading of stores. Modern electronic methods such as "shoran" and "echo sounding" are used on the hydrographic launches as well as on the ship.

Todd Converts U. S. M. C. Tanker

Puente Hills

The 16,460-d.w. ton T-2 tanker *Puente Hills* recently sailed from the Todd Brooklyn shipyard directly for Aruba, N. W. I., after a one-month job of converting her from wartime status to commercial service for the U. S. Maritime Commission. The vessel was turned over to T. J. Stevenson & Co. of New York, sub-agents for the American Pacific SS Co. of Los Angeles, California, which are acting as general agents for the U.S.M.C. in operating this and other tankers as part of the government's program to step-up fuel oil deliveries.

The work included removal of the spar deck, gun mounts and other war-time installations except the degaussing system; opening of all engine-room machinery, the main boilers, utility systems and propulsion equipment for inspection and overhaul where necessary to comply with the requirements of the A.B.S., U.S.C.G. and U.S.M.C.; installing of four 200-foot crack arrestors on deck and bottom; and making other extensive repairs to put the 3-year-old, 503-foot vessel in A-1 condition.

For this trip, the *Puente Hills* has been chartered to the U. S. Navy, and is scheduled to load cargo at Aruba and return to Melville, R. I. After that her service will change according to needs.

Mammoth Floating Derrick Drydocked at Todd's

The *Hercules*, former U. S. Navy floating derrick, with 230 ton hoisting capacity, was recently drydocked at Todd's Brooklyn shipyard for survey, bottom-painting, and miscellaneous repairs. The unique vessel towers 98 feet above the drydock bed and weighs 1,938 tons without ballast.

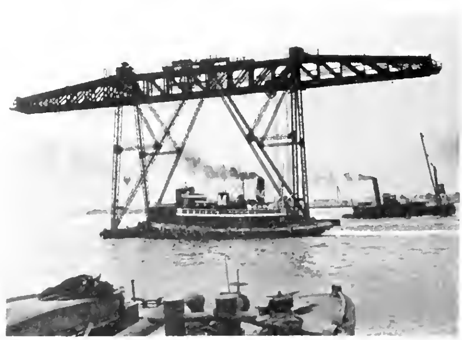
The *Hercules* was purchased by Hughes Bros. Inc., marine equipment brokers, 17 Battery Pl., N.Y.C. from the U.S. Navy, which used it at the Brooklyn Navy Yard to hoist heavy guns, turrets, etc., on battleships. They are readying the floating derrick for service wherever she might be needed around the world. After it is reconditioned, it is expected to be towed to an anchorage at Salisbury, Md., unless someone buys or leases it meanwhile.

The pontoon section of the derrick is 125′ long, 70′ wide, and 14′ deep. A stationary cantilever, straddling the supporting framework 70 feet in the air, extends 289′4″ across. This section has the steel rails on which the main trolley with 150-ton capacity, and a 15-ton auxiliary trolley travel from one end to the other. The *Hercules* can thus pick up heavy equipment like locomotives, barges, tugs, etc., at one end and transport them through the derrick's open superstructure to the other end for loading.

The vessel is not self-propelled, and must be towed to assignment locations. Her diesel-electric elaborate hoisting equipment, however, may be operated by one man working the controls.

The power is generated by a Busch-Selzer 3 cylinder, 4 cycle, Diesel Engine, connected to a General Electric Direct Current, Generator, 225 BHP, 250 volts, 400 amperes. A battery of 6 Westinghouse DC motors ranging from 60 HP to 10 HP, operate the main and auxiliary hoisting units and trolleys.

A broadside view of the floating derrick Hercules being towed by the "Thomas E. Moran" to the Todd Brooklyn shipyard.



Paul V. Gaudin

--With The

Port Engineer of the Month

LOS ANGELES

Paul V. Gaudin

Of American Pacific Steamship Company

Paul V. Gaudin's career on the seas began in 1917 at the tender age of 15 when he was employed as a night oiler on the tow boat *W. A. Bisso*, formerly the *El Toro*, built in New York for the Morgan Line. This was the first step toward his ambition to be an engineer which began when he was a child in the farming section of Louisiana and used to watch the stern wheel tow and combination packet and passenger boats along the shores of the Mississippi River.

To supplement his schooling Paul took a correspondence course in mechanical engineering and served two years of apprenticeship on various tow boats on the Mississippi. His first ship was *S. S. Beaumont* which he joined in 1919 as an oiler. Upon completion of a voyage to England he was examined for his original licenses and after completion of the examination joined *S. S. Nika*, a small combination passenger and cargo vessel trading between New Orleans and Valparaiso, Chili. He served on this vessel one year as Third Assistant after which the vessel was decommissioned.

Paul then went on *S. S. Lake Elizabeth* as Third Assistant Engineer. This vessel was owned by the U. S. Shipping Board and operated by the New York and Cuba Mail Steamship Company. For two years he was with this company on various vessels and then joined the Sinclair Refining Company in 1922 as Third Assistant Engineer on *S. S. Samuel L. Fuller*. After remaining with Sinclair until 1925, Paul took a position ashore with the Reynolds Dredging Company of New Orleans, Louisiana, as night machinist and pipefitter foreman. The company was then constructing the largest hydraulic dredge in the world. Upon completion of the construction Paul was assigned as Second Assistant Engineer, three months later as First Assistant, and two months later as Chief Engineer. He was then 24 years old.

Paul was back to sea with Sinclair in 1926, and in 1928 served as First Assistant of *S. S. Oakwood*, operated by Lykes Bros. Steamship Company. Upon completion of two voyages he joined the Redwood Line as First Assistant of *S. S. Manhattan Island*. After two voyages he was promoted to Chief Engineer.

Returning to Sinclair in 1931, Paul was assigned as First Assistant on *S. S. Joseph M. Cudahy*. In 1940 he was removed from his position as Chief Engineer of *S. S. W. C. Fairbanks* (Ex *Harold Walker*) and promoted to the position of Machinery Inspector at the Federal Shipbuilding Company, Kearny, New Jersey, which company was constructing four large modern tankers for the Sinclair Refining Company. In 1942 Sinclair sent Paul to the Pacific Coast to supervise and maintain nine vessels of their fleet which were engaged in military activities in the Pacific under charter to the War Shipping Administration.

Sinclair's fleet was reduced 50% by enemy action, thereby making many of their experienced engineers available to the government and other operating companies. Because of this fleet reduction Paul was loaned to the Los Angeles Tanker Company as Superintendent Engineer, the position which he now holds.

San Francisco April Meeting

The George E. Swett & Co., Engineers, entertained the San Francisco Port Engineers at a buffet supper April 7 in their spacious offices. The Port Engineers inspected the service facilities and the vast inventory of parts for the equipment represented by the Swett organization. Following the supper, the guests were shown a color movie film of the precision manufacture and the use of Diamond Soot Blowers in keeping the fireside of boilers clean. The film included close-up scenes showing slag quickly being removed from tubes while the boilers were under full fire.

Port Engineers -

Below: Pictures taken at the April meeting of the San Francisco Port Engineers.

Center picture shows Program Committee Chairman Marshall Garlinger congratulating Bob Dill of George Swett & Co. on his presentation of the effectiveness of soot blowing.

In the bottom picture are prominent members of the Port Engineers Society with the host George Swett flanked by President Phil Thearle (left) and the speaker, Bob Dill (toying with his Diamond Soot Blower).

William E. Sizemore

Port Engineer of the Month

SAN FRANCISCO

William Edward Sizemore
Of The Army Transportation Corps

William Edward Sizemore, affectionately known as "Bill" to all who know this genial assistant to the Superintending Engineer of the Army Transportation Corps at Fort Mason, has been connected with ships and shipping since the turn of the century. In 1902, during the Boer War, Bill Sizemore left his Kansas farm to sail as a stocktender on the Lampert and Holt steamer *Rosetta,* flying the British flag, on a voyage to Capetown, South Africa, with a cargo of 1000 horses. Bill turned sailor on the return trip, and then began his long association with the sea.

His early engineering training sent him to Merrill and Stevens Shipyard in Jacksonville, Florida, where he was employed as hull draftsman. He came to the coast in 1917 to work at the Union Iron Works (Bethlehem San Francisco Yard) on the table next to Philip H. Thearle, his present boss. From there he became associated with the American Bureau of Shipping as surveyor in the Seattle area, and later he was assigned to the Los Angeles Shipbuilding Corp. by the same agency.

After a varied career in architecture during the depression years, Bill Sizemore returned to the waterfront in 1937 as Naval Architect for the Army Transport Service, and he's been there ever since.

At home in his tiny cottage tucked away among the Sausalito hills, he keeps tab on every ship that enters or leaves the bay. He loves them all, but there is always a greater gleam of affection in his eye when one passes about which he can say "I helped build her back in—."

Picture above was taken at the February 19th meeting of Columbia River Society of Port Engineers, Portland, Oregon. Left to right (starting front, far left): Matt Trout, Marine Electric Co.; H. G. Martell, The Texas Co. (acting chairman in absence of President Walter Nagley); J. Allen Mades, Pacific Marine Review; Douglas Barnes, Coastwise Lines; H. Hottendorf, U.S.M.C., Seattle; Duncan Stewart, Surveyor; D. E. Roberts, Texas Co.; Don Bartosen, Combustion Engineer; E. Saunby, Standard Oil of Calif.; Fred Clute, Campbell-Norquist; Art Hancock of Portland; Walt Nester, General Petroleum; L. G. Larsen, General Petroleum; Edward Adamson, Chief Engineer, S. S. Wyoming-States Line; J. R. Waters, Pope & Talbot; H. D. Smith, Shell Oil; D. L. Campbell, Standard Oil of Calif.; and J. McDonald, Kaiser.

Old Clipper Controversy Settled

An argument that for over 80 years has raged up and down waterfronts of every seaport from Portland, Maine, to Portland, Oregon, has finally been settled. During all this period old sailing ship men have argued in forecastles, in bar-rooms, and in Sailor's Snug Harbor over the question of which of two Yankee clippers, the *Flying Cloud* or the *Andrew Jackson*, holds the sailing record around Cape Horn from New York to San Francisco.

In 1851 the *Flying Cloud*, fresh from the builder's yard of Donald McKay at East Boston, made the 14,800-mile voyage in 89 days, 21 hours, lowering the previous record by more than a week. Her captain, Josiah Cressy, became a national hero. Three years later Cressy and the *Flying Cloud* lowered the time to 89 days, 8 hours.

In those days, the elapsed time for a voyage was sometimes reckoned from the time the pilot was dropped off Sandy Hook until the San Francisco pilot was picked up off the Farallones. Sometimes it was figured from the time a ship raised her anchor until it was let go again—which was several hours longer than the pilot-to-pilot time.

On March 23, 1860, the ship *Andrew Jackson*, Captain John E. Williams, arrived off San Francisco, 89 days and 4 hours after dropping her New York pilot. There was no San Francisco pilot available that night, and Captain Williams had to wait till morning to bring his ship in through the Golden Gate, but he claimed the record for the *Andrew Jackson*. The log book of the *Flying Cloud* was not available, and it was not known definitely whether her 89 days, 8 hours, was anchor-to-anchor time or pilot-to-pilot time.

So for 83 years the arguments have continued—whether the Massachusetts-built *Flying Cloud* or the Connecticut-built *Andrew Jackson* was the faster.

The problem was finally settled last week by John Lyman, an oceanographer of the Navy's Hydrographic Office in Washington, who published his findings in the current issue of The American Neptune, maritime history journal. Remembering that many ships in the 1850's kept meteorological log books, which were sent to the Hydrographic Office for use in improving charts of ocean conditions, Lyman set out to find the *Flying Cloud's* 1854 log. He traced it from the Navy to the Weather Bureau, and finally to the National Archives, where it was sent about 10 years ago with other early records.

The log proved to contain a full account of the voyage and showed that the figure of 89 days, 8 hours, was anchor-to-anchor time. The pilot-to-pilot time of the *Flying Cloud* when she arrived at San Francisco on April 20, 1854, was 88 days, 22 hours, and 30 minutes. Donald McKay's early masterpiece is therefore now firmly established as the fastest American sailing ship ever built.

Running Lights

Congressman

Willis W.

Bradley

•

(See Page 94)

Congressman Bradley

A congressman with a solid background knowledge of the needs of the Navy, the Merchant Marine, and National Defense is Willis W. Bradley of California.

Congressman Bradley, Republican, of Long Beach, was born in Ransomville, N. Y., June 28, 1884. He was appointed to the United States Naval Academy in 1903 and graduated in 1906 and was captain of a Navy crew that year.

At the age of 18 Bradley served as deputy registrar of deeds of Sargent County, North Dakota. While serving aboard the *U.S.S. Pittsburgh* in World War I as gunnery officer he received the Congressional Medal of Honor, and during the latter part of the war became chief of the Ammunition and Explosives Section of the Bureau of Ordnance, Navy Department. From 1929 to 1931 he served as Governor of Guam, and as captain of the Navy Yard went to Pearl Harbor in 1933.

Congressman Bradley went to San Diego in 1939 to fit out a squadron of destroyers, becoming commander of Destroyer 31. He then proceeded to the Atlantic, continuing in this command and as commander of the Carribean Patrol until late in 1940 when he returned to Long Beach with duty on the Board of Inspection and Survey. Shortly after the outbreak of World War II he made an extended visit to the Aleutians to inspect and survey, at sea, naval vessels in that area, then engaged in ousting the Japanese from Kiska and Attu.

After 43 years of service Bradley retired from the Navy in 1946. His wife is Sue Worthington (Cox) Bradley and they have four daughters, all married to servicemen, and eight grandchildren.

He is a member of the Masonic Order, National Sojourners, B.P.O. Elks, Loyal Order of Moose, American Legion, AMVETS and Veterans of Foreign Wars. In November, 1946 he was elected to the Eighteenth Congress, and has been a powerful advocate of a strong Merchant Marine.

Camp Appointed Vice-President Of Sopac

George Plant, president of Sopac Ship Maintenance, Inc., 1168 Battery Street, San Francisco, announces that

Jim Camp, vice president and general manager, (left) and George Plant, president of Sopac.

A. W. Zipf, chemical director (left) and William Harris, sales engineer of Sopac.

James Camp is now associated with his firm as vice president and general manager.

Camp is well known to the West Coast Maritime circles, having been engaged in ship maintenance activities in San Francisco for the past twenty-one years as superintendent and general manager of another well known ship service company from which he resigned to take up his new duties. Recently he returned from Mobile, Ala., and Beaumont, Tex., where he established offices and directed Sopac's large tanker conversion program.

Another addition to Sopac's experienced staff is A. W. Zipf, who will manage their ship maintenance chemical division and is an expert on mechanical cleaning.

Included in Sopac's future plans are the opening of offices and facilities in Norfolk, Va.

New home of Frank Groves Company in San Francisco. Office and warehouse has approximately 40,000 square feet of floor space with three elevators and a railroad spur track.

Frank Groves Marks Fifteenth Year

The story of the progress attained by the Frank Groves Company in its fifteen years in business was well presented in a recent issue of "The Nedmac Bulletin," monthly publication of the company.

The company, which is engaged in the manufacture and distribution of power, marine and industrial engineering specialties, was started by Frank Groves in January, 1933 at 55 Montgomery St., San Francisco.

The Frank Groves Company now has complete Coast coverage with offices and warehouses in San Francisco, Portland, Seattle and Los Angeles. Recently they expanded their San Francisco branch and moved to new, larger quarters at 144 Spear St.

S F PROPELLER CLUB

Top picture, left to right: Harry Lundberg, Secretary-Treasurer of Sailors Union of the Pacific, and President of Seafarers International Union; Hugh Gallagher, Vice President and Operating Manager of Matson; Lewis Lapham, President of American-Hawaiian S.S. Co. and President of the Propeller Club; Maitland S. Pennington, Vice President of Pacific Transport Lines.

Bottom picture, at head table, left to right: Commodore Ihrig, Superintendent, California Maritime Academy; Frank Di Marco, public relations specialist; Robert Mayer, Pacific American S.S. Association; Almon E. Roth of the Employers Council; Harry Lundberg; Hugh Gallagher; Lewis Lapham; Maitland Pennington; Lloyd Fleming, Pacific Coast Director for U. S. Maritime Commission; W. Miller Laughton, Pacific Coast General Manager of Bethlehem Steel Co. Shipbuilding Division; Capt. Malcolm Crossman, Superintendent, U. S. Maritime Academy, Alameda; Eugene Hoffman, public relations manager, American President Lines and Secretary-Treasurer of the Propeller Club.

Something New in Maritime Meetings

At the April 21 meeting of the San Francisco Propeller Club the four prominent shipping people shown in the top picture provided a program consisting of a forum on the "Future of the American Merchant Marine." They discussed the need for ships, the foreign competitive situation and other problems of the industry, and contrary to some expectations, Messrs. Lundberg, Gallagher, and Pennington were substantially in accord in their suggestions for government and private action in maritime affairs. Lapham presided and acted as moderator.

A record crowd of some two hundred leaders of the industry attended and, after a question and answer period, expressed satisfaction with the evidence of unity of purpose.

Todd Acquires San Francisco Shipyard Properties

According to a joint announcement made by John D. Reilly, President of Todd Shipyards Corporation and John E. Cushing, President of Matson Navigation Company, Todd has signed a ten-year lease on the 25-acre shipbuilding and repair yard at Alameda, California, and for the use of Pier 36, and for facilities at Beale Street, San Francisco, owned by United Engineering Company, a wholly-owned Matson subsidiary. The effective date of the transfer is understood to be May 15.

United was originally purchased by Matson during World War II, when the latter company expanded its facilities as a contribution to the war effort. Matson has decided to confine its marine activities to its normal function of operating cargo and passenger ships and divest itself of its ship repair and construction business.

United Engineering Company will continue to operate as a Matson subsidiary, but will confine itself to its facilities in San Francisco only, which will continue to be devoted to commercial manufacturing and machine shop work.

Todd fills an important gap in its West Coast operations with this acquisition, which gives it ship repair and conversion facilities in three important Pacific ports—Los Angeles, San Francisco and Seattle. Todd now operates eight shipyards in the United States and one in South America. The other plants are located in Galveston, New Orleans, Charleston, S. C., Brooklyn, Hoboken, and in Barranquilla, Colombia.

For some time Todd has maintained a sales office at 486 California Street, San Francisco, which will be retained as the Company's city headquarters.

Todd's plant at Alameda, Calif., just taken over as part of the properties of United Engineering Company in San Francisco and Alameda.

Executives named to Board of National Federation of American Shipping.

Top, left to right: Charles L. Wheeler, Albert W. Gatov, George Killion.

Opposite, left: A. R. Lintner.

Opposite, right: John E. Cushing.

Pacific Coast Men On NFAS Board

Five Pacific Coast steamship executives were named to the Board of Directors of the National Federation of American Shipping at its annual meeting in New York City, and will represent the Pacific American Steamship Association and the Shipowners Association of the Pacific Coast. NFAS, with headquarters in Washington, D. C. represents the bulk of all American shipping.

West Coast representatives on the NFAS Board of Directors will be John E. Cushing, President, Matson Navigation Company; George Killion, President, American President Lines; A. R. Lintner, President, American Mail Line; Charles L. Wheeler, Executive Vice President, Pope & Talbot, Inc.; and Albert W. Gatov, President, Pacific American Steamship Association.

The Weyerhaeuser Steamship Company, another West Coast line, is represented on the Board with an alternate Director, W. H. Peabody, Sr.

Other Directors are: R. R. Adams, Grace Line; Frazer A. Bailey, NFAS; John M. Franklin, United States Lines; J. J. Halloran, Sprague Steamship Co.; Charles Kurz, Keystone Shipping Company; Joseph T. Lykes, Lykes Bros. Steamship Co.; John McAulliffe, American Eastern Corp.; H. Harris Robson, United Fruit Co.; and H. W. Warley, Calmar Steamship Co.

Other alternate Directors are: A. A. Alexander, American President Lines; W. R. Chamberlin, Sr., W. R. Chamberlin & Company; M. G. Gamble, Standard Oil Company of New Jersey; John F. Gehan, American Export Lines; Lawrence W. Hartman, American Mail Lines; Lewis D. Parmalee, Agwi Lines; W. Creighton Peet, Matson Navigation Company; Frank J. Taylor, American Merchant Marine Institute; and Walter M. Wells, Isthmian Steamship Company.

BILGE CLUB BANQUET

Above pictures taken at Bilge Club Banquet in Los Angeles

Top picture, left to right: Ray L. Sullivan, Hagan Corp.; Entertainer; Bill Foster, Hagan Corp.; Capt. L. L. Lishman; Bill Eigle (standing), Pope & Talbot.

Second picture, left to right: Jim Eitze; Phil Moss, Morton L. Booth, Bechtel International Corp.; John Daulley, B & M Meat Co , Ship Provisioners.

Third picture, speaker's table, left to right. Al Boro, Costello Supply: Bob Snodgrass, secretary of Bilge Club; W. S. Rash Fishermen & Merchants Bank, Arthur R. Pegg, Jr., International Marine Paint Agency; Ed Marshall, John E. Marshall, Inc.

Fourth picture, left to right, seated Bill Kane, Todd Shipyards Corp.; E. W. Pike, Amer. Bureau of Shipping; Russell Cyrus, Union Oil; Frank Cavanaugh, Cavanaugh Machine Works; Roy Harris. Left to right, standing: J. Robert Gaffney, The De La Rama S.S Co.; George Hayes, W. P. Joyce; M O. Barnett, H. Jillsing

Bottom picture, left to right, seated Irving Blumberg, B. & M. Supply Co.; Ed Whitemore, Atlas Paint & Varnish Co.; Jack Cooper, Gridley Construction Co.; Knox Price, Atlas Paint & Varnish Co.; Clarence Kehky, Terminal Island Naval Drydocks Left to right, standing Monty Locaty, Robert G. Allen Co.; Joe Hare, U S Maritime Commission.

Top picture, speaker's table, left to right. Jim Buntin, Forster Shipbuilding Co.; Floyd Nelson, Texas Oil Co.; W. J. Courtiour, Bethlehem Steel Co.; Earl Archibald, Sunset Oil Co.; Walter Richards, Wilmington Iron Works (President of Bilge Club).

Second picture, left to right, front Ted Rosner, Ed Harris, and Dan Costley all of Pope & Talbot.

Third picture, left to right, seated George Messall, C. & M. Machine Co.; Capt. F. D. Pennoyer, San Diego Boat Pilots; C. S. Sampson, L A. Harbor Commission; Arthur Eldridge, L. A. Harbor Commission; Rolf Monsen, Todd Shipyards Corp.; Jack Gilbride, Todd Shipyards Corp.

Fourth picture, left to right, seated: G. M Davis; Guy Yates, U. S. Lines; George Downey, U. S. Lines; H. Delavergn, U. S. Lines; C. Granger, U. S Lines; Kenneth Noel, U. S. Lines, Al Strum. Standing, left to right Russ Hanner, Calif. Ship Supply; L. R. Allen; Art Strum, Coastwise Line.

Bottom picture, past presidents' table, left to right: Joe Costello, Costello Supply; Duke Decker, San Pedro Tugboat; Dan Dobler, Texas Oil Co ; Burt Pegg, Marine Solvents Corp.; Harry Summers, Amer. Bureau of Shipping; Tom Forster, Forster Shipbuilding Co.; J. W. Malseed, Shell Oil Co ; Arthur Pegg, International Paint; Buck Buckholtz, Metropolitan Stevedore.

Garrison Promoted; Jackson Succeeds Him

F. Lowell Garrison

F. Lowell Garrison of the General Electric Company on April 15th will become Radio Sales Manager for the San Francisco district of the General Electric Supply Corporation.

He will make his headquarters here and will be responsible for the sale of radio and television receivers in the area served by the San Francisco district which includes all of northern California as far south as the lower San Joaquin Valley plus western Nevada.

A native Northern Californian, Mr. Garrison received his B. S. degree in electrical engineering from the University of California, Berkeley, in 1929 and was enrolled immediately in the General Electric Company's test course for beginning engineers at Schenectady, N. Y. After his training there he returned to San Francisco with the company's refrigerator reconditioning plant as engineer. In 1934 he went to the G-E Supply Corporation at Butte, Montana, becoming assistant sales manager in 1938. Four years later he was transferred back to San Francisco to the company's Apparatus Department, Engineering Division, as field engineer to cover the large shipyards.

In March 1944 he took over his present assignment as Western Representative for G-E's Advertising and Publicity Department, assigned to the General News Bureau and handling publicity for all departments of the company. His area included the three Pacific Coast states, Arizona, Nevada and Western Utah.

Mr. Garrison is a member of the Press Club of San Francisco, the Electric Club of San Francisco, and the San Francisco Advertising Club.

Robert W. Jackson of the General News Bureau in Schenectady, N. Y., succeeds Garrison. Prior to going with General Electric in 1945, Jackson served for three years as news editor of the 13-state division of the U. S. Marine Corps Public Relations in Philadelphia.

Robert W. Jackson

Before enlisting in the Marines, he was a member of the editorial department of the Charleston (West Virginia) Daily Mail for ten years, serving as a general news reporter, columnist and motion picture editor. He is a native of West Virginia.

Davidson Retires; Minnick Takes Over

Appointment of J. H. Minnick as marine engineer of Shell Oil Company's lubricants sales department for the Pacific Coast territory is announced by A. L. Wiest, department manager. Minnick will replace C. A. Davidson whose retirement on July 10 terminates a 20-year association with the marine industry as a representative of Shell.

Minnick is no newcomer to Pacific Coast shippers. Following graduation from the Massachusetts Institute of Technology in 1931, he joined the engineering staff of the Matson Navigation Company and for five years served aboard various vessels under the Matson banner. In 1936 Minnick started with Shell as a mechanical engineer at the Wilmington - Dominguez (California) refinery where he was engaged in engineering design, operation, and maintenance of mechanical equipment.

During World War II he attained the rank of Commander in the U. S. Naval Reserve and served as chief engineer on various units of the Pacific Fleet, including the anti-aircraft cruiser, *Tucson,* to which he was ordered as commissioning engineer in 1944 and in which he served during the last stages of the war.

As marine engineer with Shell, Minnick will be responsible for marine lubrication service on the West Coast. He will make his headquarters in San Francisco.

J. H. Minnick

New and Retiring Officers of Standard Oil of California




▲

Left to right: J. L. Hanna, former vice president, now retired; Hillyer B. Brown, vice president and director; Paul L. Fahrney, vice president; Marshall Madison, general counsel.

◄

J. H. MacGaregill, former vice president and director of Standard Oil of California, now retired.

Engineering Society Elects Westling Chairman

L. L. Westling, well-known member of the shipping fraternity has been elected to the Chairmanship of the San Francisco Section of The American Society of Refrigerating Engineers, succeeding Edw. Simon, consulting engineer of San Francisco.

Westling has been on the Engineering Staff of The Matson Navigation Company for over twenty-five years, is known as an authority on marine applications of refrigeration and has contributed extensively to the literature on the subject. He is also a member of The Society of Naval Architects and Marine Engineers.

Ship Owners Assn. Opens Office in Washington

The Association of American Ship Owners announces the opening of an office in Washington, D. C., in charge of Lynn E. Mote, formerly secretary and legislative assistant to Hon. Eugene D. Millikin, United States Senator from Colorado.

E. J. McMahon

Dearborn Elects McMahon a Director and Vice-President

E. J. McMahon, Production Manager of the Dearborn Chemical Company, was elected a Director and Vice-President at the annual stockholders' meeting held recently at the company's main offices in Chicago. He succeeds John W. Brashears who has been with Dearborn Chemical Company 52 years, a member of the Board of Directors since 1912, and who was retired as an honorary director for life.

KEEP POSTED

New Equipment and Literature for Yard, Ship and Dock

Bulletin on Whistles

A new 12-page illustrated booklet (No. 466) titled: "Engineering, Operating and Maintenance Data on Leslie-Tyfon Whistles and Signals," has been announced by Leslie Co., Lyndhurst, N. J., manufacturers of Pressure and Temperature Regulators and Controllers, Strainers and Whistles.

Design and operation of these Whistles and Signals are fully described and completely illustrated in detail. Installation of Leslie-Tyfon Steam and Air Whistles is covered in one part of the booklet, while another section is devoted to the subject of maintenance of these Whistles, both subjects being presented in itemized, easy-to-follow sequence.

Cordes Brothers, San Francisco, are Pacific Coast Marine distributors for Leslie Company.

Safety Hand Truck

A light-weight, sturdy hand truck, combining many safety features, is available from General Scientific Equipment Company, Philadelphia.

Of riveted, welded and bolted construction, with tubular handles, and 6" aluminum acid-resistant wheels or rubber tires, this Safety All-Purpose Hand Truck has two carrying positions which adapt it to a variety of portage jobs. In the open position the truck can be used to safely move carboys, acetylene tanks, barrels, packages and other items in a vertical position to avoid spilling the contents. In the closed position the truck can be used as a hand truck to transport boxes, barrels and similar items in the conventional manner.

PALMER-SHILE ALL STEEL SKID AND END RACK

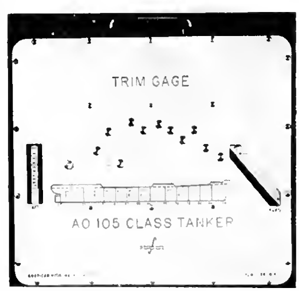
All-Steel Skid

A new type all-steel skid with end racks has just been developed by the Palmer-Shile Company. Especially designed for handling heavy loads with ease and safety, it is built of heavy gauge corrugated steel, with sturdy angle iron legs that provide ample clearance for fork lift or hand-operated trucks.

The removable end racks facilitate loading and unloading. Excellent for handling hot metal parts, the skid can also be built with ventilated bottom.

Trim Gage

Problems in predetermining the Fore and Aft Draft which a ship will have under any longitudinal distribution of load are automatically calculated by a new Trim Gage, developed by American Hydromath Co., New York City. The Trim Gage simplifies the work of operating personnel, both aboard and ashore, by helping them formulate loading plans quickly and obtain, almost instantaneously, the desired trim for any given consignment of cargo, with a minimum of ballast. Unusual or special loadings can be tried out on the device, including ballast trim, partial loadings, trimming for dry dock, etc.



Draft fore and aft calculated by this new Trim Gage.

Pacific Marine Review

NEWS FLASHES

FEDERAL DRY DOCK SOLD TO NAVY

The offer of Federal Shipbuilding and Dry Dock Company to sell its shipbuilding yard and principal facilities, at Kearny, New Jersey, to the United States Navy has been accepted by the Navy. The price to be paid is approximately $2,375,000, representing the depreciated book value of these physical assets.

It is contemplated that the yard will be transferred to the Navy upon the completion of the work now in process. U. S. Steel has no other shipbuilding operation.

* * * * *

UNITED ENGINEERING YARD LEASED TO TODD

According to a joint announcement made by John D. Reilly, president of Todd Shipyards Corporation and John E. Cushing, president of Matson Navigation Company, Todd has signed a ten-year lease on the 25-acre shipbuilding and repair yard at Alameda, California, and for the use of Pier 36, and for facilities at Beale Street, San Francisco, owned by United Engineering Company, a wholly-owned Matson subsidiary. See story in this issue.

United Engineering will continue to operate as a Matson subsidiary, but will confine itself to its facilities in San Francisco only, which will continue to be devoted to commercial manufacturing and machine shop work.

* * * * *

BIG EXPORT FUTURE TO SOUTH AMERICA

American exporters will never catch up with the wants of Latin American countries, Joshua Powers, president of Export Advertising Association, Inc., told delegates to the Chicago World Trade Conference.

Improvement in living standards and better social conditions in Latin America already dominate inter-American trade, Powers said. "Advertising, the motion pictures, radio and learning to read have multiplied wants", he said. "You exporters will never catch up with filling these wants, because your customers are multiplying also," he added.

* * * * *

BETHLEHEM WILL CONSTRUCT 17 BIG TANKERS

Bethlehem Steel Corporation reports orders or awards for 17 big tankers with a total selling value of $100,000,000.

This will provide a couple of good years for its Sparrows Point yard, where 13 of the tankers will be built, and Fore River, where four will be built.
13 of the tankers will be built, and Fore River, where four will be built.

* * * * *

90 VESSELS TO BE SURVEYED FOR OVERHAUL AT SAN FRANCISCO

Approximately 90 vessels assigned to the small craft fleet of San Francisco Port of Embarcation are undergoing annual survey and overhaul in one of the most extensive maintenance programs in maritime circles, Port Headquarters announced.

The program being carried out by the Marine Engineering Branch of Water Division affects 30 vessels in active use and 60 forming the reserve fleet held in wet storage at Mayberry Slough.

In each case the vessel is surveyed to determine what maintenance and repair jobs are necessary to keep the craft in good condition. On the basis of these surveys, contracts are awarded ship repair yards and shops of the San Francisco Bay Area to do the necessary work.

Involved are tugs, barges, ferry boats, FS (freight supply) boats, a laid-up minesweeper and all other small craft assigned to the Port.

* * * * *

$2,500,000 O K'd FOR DEL MONTE

Legislation signed May 11 by President Truman provides $2,500,000 for purchase by the Navy of the Del Monte Hotel in Monterey for use as a post graduate school, called the "Annapolis of the West." The school was described in the Pacific Marine Review for March.

* * * * *

THE WEICHEL BILL

Congressman Weichel and Senator White have introduced bills in Congress for widespread amendments to the Merchant Marine Act of 1936 as advocated by the National Federation of American Shipping. The bills call for 50% subsidies for construction for both domestic and foreign service, rate regulation on competitive port services, tax and depreciation reforms. See editorial, this issue.

* * * * *

ALASKA

Legislation continuing financial assistance to steamship lines serving Alaska now seems probable, says B. H. Parkinson, executive vice pres. of Coastwise Line. It is thought that new services to Alaska may be in prospect.

* * * * *

ONE PACIFIC COAST YARD'S WEEK

USAT David S. Shanks	U. S. Army Trans. Corps	Conversion
USAT Fred C. Ainsworth	U. S. Army Trans. Corps	Conversion - Enter DD No. 2 0600 May 11
MV Hilo	Pillsbury & Martignoni	Survey
USAT Frederick Funston	U. S. Army Trans. Corps.	Conversion
SS Comet	U. S. Lines	Recondition Survey
USAT James O'Hara	U. S. Army Trans. Corps.	Conversion
USAHS Comfort	U. S. Army Trans. Corps.	Conversion
Dredge Texas) BC 3242)	J. M. Allen	Miscl. Repairs
SS Northfield	Keystone Shipping Co.	Conversion & Misc. Repair
SS Sea Bass	Luckenbach S.S. Co.	Recondition Survey
SS Sea Cat	Luckenbach S.S. Co.	Recondition Survey
PC-1586) PC-1599) PC-1587) PC-1591)	Std. Oil Co. of Calif.	Lay up and Survey
SS Ramapo	Mar Trading Corp.	Miscl. Repairs
SS Brainerd Victory	American Pres. Lines	Voyage & Damage Repairs
SS Hawaiian Refiner	Matson Nav. Co.	Repairs & Alterations
SS Eugene W. Hilgard	U. S. M. C.	Drydock & Miscl. Repairs
SS Santa Leonor	Grace Line	Miscl. Repairs
MV Agamemnon	Blue Funnel Line	Miscl. Repairs
USHB San Leandro	U. S. A. T. Corps.	Drydock & Miscl. Repairs

NEW TOWBOAT DUE FOR WESTERN TRANS. CO.

Soon to join the fleet of Western Transportation Company on the Columbia River in the vicinity of Portland is the towboat Peter W. The vessel is now being converted from a Navy LSM at the Albina Engine & Machine Works in Portland.

* * * * *

U. S. MERCHANT FLEET AS OF MARCH 1

TABLE I -- U. S. Flag Privately Owned Fleet

	Jan. 1, 1948	March 1, 1948
Total	1,003	1,072
Dry Cargo	643	657
Tanker	360	415

TABLE II -- Government Owned Vessels Under Bareboat[1]

	Jan. 1, 1948	March 1, 1948
Number Under Bareboat	1,128	1,018
Withdrawn from charter but not yet redelivered	52	74
Total	1,076	944

TABLE III -- Government Owned Vessels Under General Agency Agreement

	Total	Active	Inactive	Total	Active	Inactive
Total	230	109	121	199	57	142
Dry Cargo	84	8	76	90	8	82
Tanker	146	101	45	109	49	60

TABLE IV -- Vessels in the Reserve Fleet[2]

	Jan. 1, 1948	March 1, 1948
Total	1,325	1,318
Overage Vessels		
Dry Cargo	104	86
Tanker	12	10
World War II Built Vessels		
Dry Cargo	1,117	1,182
Tankers	92	40

[1] In addition, five government owned passenger vessels are being operated under special bareboat charter agreements.

[2] Excluding barges, tugs, military auxiliaries, concrete ships and British Liberties.

* * * * *

INDUSTRIAL DEVELOPMENT IN SOUTHERN CALIFORNIA

During the month of April, 12 new factories were established in Los Angeles County with a total investment of $822,000, and creating 258 new jobs for factory workers. Twenty-seven (27) existing plants were expanded, calling for an additional investment of $10,234,000, and creating 488 new industrial jobs.

Total investment in the 39 new and expanded units was $11,056,000, creating a total of 746 new jobs.

For the year to date, 60 new factories were established with a total investment of $7,339,000 and creating 2,754 new jobs; 119 plants were expanded, calling for an additional investment of $22,697,500, and creating 2,198 new industrial jobs.

Total investment for the year to date in the 179 new expanded units was $30,036,500, creating a total of 4,952 new jobs.

Dearborn Appoints Jones Chief Engineer

Frank A. Jones, formerly associated with Terminal Railroad Company, St. Louis; Busch-Selzer Bros. Diesel Engine Company, St. Louis; and the Missouri Pacific Railroad, has been appointed Chief Engineer of Dearborn Chemical Company, with headquarters at the Company's general offices, 310 S. Michigan Avenue, Chicago, Illinois. He will supervise all engineering activities, foam-meter equipment, and the development of new equipment.

Mr. E. A. Goodnow, whom he succeeds, has relinquished his position due to ill health, but he will remain with the Company as Assistant Chief Engineer.

Frank A. Jones

AUTOMOTIVE GEAR RATIO

(Continued from page 87)

box for the speed reductions. It is used for starting only.

Because ACTION and REACTION are EQUAL the torque output must be supplied by an equal torque input in the opposite rotation. The additional counter torque reaction in a speed reducing gear box is on the frame of the gear assembly. The output torque may be four times the input engine torque. The gear box will have three times the engine torque on it so that this plus the engine torque gives the four times value. The straight hydraulic clutch has no fixed member to give additional counter torque. There are, however, several cars on the market which have a fixed member in the fluid clutch assembly which when the output speed is much less than the input speed takes additional reaction and the output torque is greater than the input, thus acting more like a gear box than a fluid coupling. When the output speed comes up to nearly that of the engine the output torque reduces until no more reaction torque is needed and the forces on the additional fixed member in the clutch reduces to zero and then reverses. By providing it with an overrunning hub like a free wheeling drive the reversal of torque causes it to turn freely. When turning, it no longer is a factor in the fluid clutch and the output speed comes up to equal the engine speed minus a little loss as is found in all fluid drives.

This is schematically shown in the bottom sketch on the right.

Our next Chalk Talk will discuss the mathematics of the screw.

Solution of the Right Spherical Triangle

(Continued from page 85)

it being the Hypotenuse we must use its complement which is the altitude, and in this case just what we want, we can develop the formulae:

Sin altitude equals Cosin K (plus or minus) L multiplied by Cos R so

Log Sin Alt. equals log Cos K (plus or minus) L plus log Cos R

Log Cos K (plus or minus) L	9.91913
Log Cos R	9.95359
Log sin alt.	9.87272
Alt.	48° 14′ 32″

STEP 4. To find the azimuth of the body we can use K (plus or minus) L as the middle part and develop the formulae:

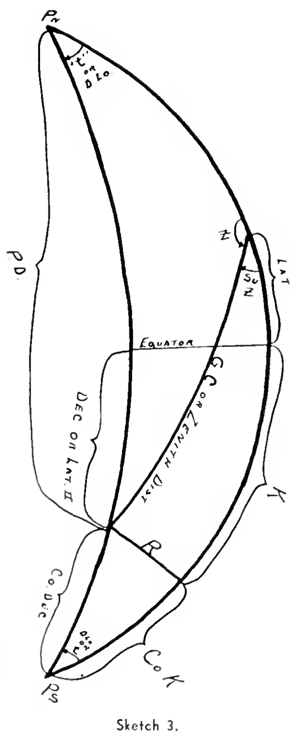
Sin of K (plus or minus) L equals tan R multiplied by tan Co azimuth or

Sin of K (plus or minus) L equals tan R multiplied by Cotan azimuth so

Log Sin of K (plus or minus) L minus log tan R equals log Cotan azimuth

Log Sin K (plus or minus) L	9.74634
log tan R	9.68855
log Cotan azimuth	10.05779
Azimuth equals N.	41° 11′ 56″ W
or	318° 48′ 04″

The problem is complete and we can easily see that after a little practice and having a clear mental picture of the Spherical Triangle we will be able to use any of the five parts as the middle part and develop our formulae for the solution.



Sketch 3.

Conditions are not always as those shown in Sketch 2 or as used in the above problem thus causing us to have to reason out the answers to some things. An instance where conditions would be different would be when Latitude and Declination were of opposite names. Then if we erected a perpendicular as shown in Sketch 2 it would fall on the other side of the Pole from our position or on the lower branch of our meridian and would then be of no value to us. So we erect the perpendicular as shown in Skerch 3 and it then does not fall between our position and our elevated pole but in the same hemisphere as the body or if it is a Great Circle problem as the Destination.

As is quite evident in the sketch the problem can be solved as before and if we keep in mind just what we are doing, there will be no difficulty in determining the azimuth which is the only place we are apt to become confused in the solution.

In a future article the versatility or "Napier's Rules" will be discussed regarding, vertex of G. C. courses, Time and Altitude of a body when on the Prime Vertical, etc.

GAS TURBINE

(Continued from page 57)

horsepower per hour can be built. To obtain this higher efficiency, units of larger capacity are necessary, because turbine and compressor efficiencies are affected by clearance areas. Maximum or near maximum component efficiencies occur with blade heights at least twice those used on the present machine. In addition, the cost of a larger unit per horsepower should be substantially less.

TEST

Table 1—Hours of Test Operation at Various Temperatures
(As of January 15, 1948)

Temperature Degrees F	Time—Hours
500-600	18
600-700	160
700-800	178
800-900	75
900-1000	102
1000-1100	123
1100-1200	81
1200-1300	138
1300-1400	156

BOOK REVIEW

MARINE DIESEL ENGINE STANDARDS, published by the Diesel Engine Manufacturers Association. Price $5.00.

Recently published for the use of naval architects, shipbuilders and ship operators, this book covers the application, performance, operation and maintenance of marine Diesel engines in the types of craft in which they are commonly used. Fuel oil, lubricating oil, and engine parts and accessories are also discussed.

The 19 chapters were written and edited to final form by a committee of engineers, drawn from DEMA's membership. Fifty-five illustrations, including charts, diagrams and action-pictures of vessels amplify the text treatment. The appendix contains formulae, tables and conversion data.

Shown, left to right, are Ralph Zobrist, Marine Representative for General Petroleum Corp., Lee Wiley, Chief Engineer of Sunset, and Anton Bregante, owner of Sunset.

5000 Hours Without Oil Change

Anton Bregante's tuna clipper *Sunset* chalked up an unusual operating record when its 850 H.P. Atlas Diesel engine operated in excess of 5,000 hours during a 309 day fishing period with the same oil in its crankcase.

According to Lee Wiley, chief engineer and co-owner of the *Sunset*, there were three factors which enabled him to operate on the same oil for the 309 day period: the oil, the filtering system, and periodic testing of the oil to assure its capability of proper lubrication.

During the 309 day period the oil was tested at intervals from 36 days to 110 days, by General Petroleum's Marine Department for users of their Gargoyle Marine Oils.

The *Sunset's* Atlas Engine would still be lubricated by this same oil that has done the job for over 5,000 hours but for a water leak which necessitated draining.

Merchant Marine Memorial Book

As a tribute to U. S. Merchant Marine graduates and members of the Cadet Corps who gave their lives in World War II, the U. S. Merchant Marine Academy, Kings Point, L. I., N. Y., has issued a Memorial Book to parents of these men. Views of foreign Cadet-Midshipmen, the guard of honor, and a graduating class are presented to show the Academy as it pays homage to those in whose spirit they are continuing to build. The book shows an aerial view of the Academy and pictures of its memorial and square, with the list of names of the men reproduced from the actual plate on the memorial.

Bohuslav Joins Engineering Controls

In line with their program of expansion, L. C. Harbert, president of Engineering Controls, Inc., Los Angeles and New York, announces that Hans Bohuslav, widely known gasoline and Diesel engine authority, has joined that organiation as vice president in charge of engineering.

Bohuslav's designing ability, experience and knowledge of all types of engines, make him a valuable addition to an outstanding staff of engineers, designers and manufacturers of vapor phase engine cooling and waste heat recovery systems and of automatic engine controls.

For the past five years at Buffalo, as vice president in charge of engineering of Sterling Engine Company, Mr. Bohuslav gained international recognition for his design and development of the Sterling line of Viking Diesels. During the ten years prior to that, he served in a similar capacity with Enterprise Engine & Foundry Company of San Francisco, and is credited with the design and development of the current line of Enterprise Diesel and Gas Engines.

Hans Bohuslav

New Oregon SS Agency

A general steamship agency, to be known as Commercial Marine Company, Inc., has been opened at North Bend, Oregon, to cover the Coos Bay Area. Capt. W. J. (Whitey) Wilkinson is secretary and treasurer and general manager, and A. P. Patten, marine surveyor, is president of the new firm.

Capt. Wilkinson spent twenty-two years with the Alaska Steamship Company and five years with the Nelson Steamship Company. He was the first marine superintendent for the Luckenbach Steamship Company in Seattle.

Over one million dollars is expected to be spent in dredging out the Coos Bay Area so that lumber can be shipped on large ocean-going ships.

Capt. W. J. (Whitey) Wilkinson

F. H. Searight

Dake Transferred To West Coast

The Cargocaire Engineering Corporation has announced the transfer of Lawrence Dake as Vice President in Charge of West Coast Operations with offices at 417 Market Street, San Francisco. Mr. Dake, who is a Vice President of Cargocaire, until recently made his home in New York. He is a member of the Society of Naval Architects and Marine Engineers, the Society of Naval Engineers and the Propeller Club of the United States.

Lawrence Dake

Searight Appointed

Transmission Engineering Company, San Francisco, recently announced the appointment of F. Harvey Searight as Consulting Engineer to cover the local maritime field for Pacific Pumps, Inc., Huntington Park, California.

Searight worked as a Junior Design Engineer on marine engines and hull designs under Hopps and Ransom, Consulting Engineers, of San Francisco, and was Port Engineer for the Robert Dollar Company and the Union Lumber Company's Steam Schooner *The Noyo.*

In 1904 he was transferred to Charles C. Moore & Company Engineers where he was engaged in steam power plant design and marine boiler installations. He joined the electrical engineer's office of the Southern Pacific Company in 1907 and was instrumental in the design of the Fruitvale Power Station and sub-stations for the electric train operations in Alameda, Oakland, and Berkeley.

From there he went to the San Francisco office of the Allis-Chalmers Manufacturing Company in 1911 designing steam turbine power plants for utilities and saw mills and detailing saw mill layouts. He later entered the Sales Department, becoming Assistant Manager in 1942 and Manager in 1944, which office he held until his recent retirement from the company.

Truett Returns to S. F.

W. A. Reanier, Sales Manager, Tide Water Associated Oil Company, has announced the appointment of Dick M. Truett, as his executive assistant in the San Francisco general office.

Truett moves back to the Bay Area after four years in the company's Los Angeles offices. He was assigned to Associated offices in Oakland and San Francisco from 1938 to 1943, and originally started with the organization at Fresno, California in 1937.

Prior to joining Associated, Truett held a position as personal secretary to Stanley Dollar of the Dollar Steamship Lines.

A fellow doesn't last long on what he has done. He's got to keep delivering as he goes on.—CARL HUBBELL.

Friend and Bayerlein Honored by France

Above, R. W. Bayerlein
Opposite, Robert E. Friend

The French Merchant Marine lission recently presented awards t two officers of the Nordberg lanufacturing Company. The award t Officer du Merite Maritime was gven to Robert E. Friend, Presient of Nordberg Manufacturing Ompany, and the award of Chevalr du Merite Maritime was given to Roland W. Bayerlein, Vice President. The presentations were made at the Nordberg plant by Commander L. Poirer, F. N., Chief of Naval Material, French Merchant Marine Mission, in the name of His Excellency Henri Bonnet, French Ambassador to the United States.

---

erst
hip Service

In celebrating its first anniversary ts month, the Gerst Ship Service Cmpany reports that in the first yr of operations more than two sore ships have been serviced by t company from its headquarters a Pier 27 in San Francisco.

Among the Army transports wich recently went through the Crst cleaning and servicing operatns are the *General C. G. Morton* al the *General D. E. Aultman*.

C. J. Gerst, owner of the compy, is well-known on the San Fncisco waterfront where he has bn active in the ship servicing bsiness for the past nine years. He rigned as superintendent of anoer company a year ago to open h own business.

The company is completely euipped for all types of ship maintnance work, including scaling, sd blasting, painting, tank cleanit, and conversion, boiler cleaning, g freeing, and similar work.

Consolidated Extends Services

Consolidated Services, Inc., Seattle, now is handling service on Hagan control systems in marine installations, it is reported by D. J. Erickson, vice president in charge of sales, Hagan Corporation. They are prepared to provide Hagan repair parts on all marine installations of Hagan controls. This is in addition to the Seattle firm's other engineering service work in the shipping industry.

The Northwest Filter Company, Seattle, is Hagan's exclusive sales agent in the state of Washington.

New Port Steward For P.F.E.L.

Pacific Far East Line, Inc. announces appointment of T. J. Taylor as Port Steward. Mr. Taylor formerly served with American Export Lines of New York and Parry Navigation Co.

Frank L. Sacha

New Hotpoint Manager

Frank L. Sacha has been appointed manager of the commercial cooking division of Hotpoint, Inc. He will work with veteran Grant Call, former manager, who will continue to serve in an advisory and consulting capacity. Sacha has been associated with Hotpoint for many years in various sales capacities, and at one time was manager of the company's Washington (D. C.) office. Until recently he was manager of the water heater sales department.

W. H. Rowand Named Chief Engineer of Babcock & Wilcox

W. H. Rowand was named chief engineer of The Babcock & Wilcox Company at a meeting of the Board of Directors of the company in April. The position is a new one created by the recent promotion of Alfred Iddles to the presidency of the company. Rowand will assume most of the engineering activities previously handled by Iddles.

Rowand has been with The Babcock & Wilcox Company for 19 years. He studied mechanical engineering at Cornell University, class of 1929, and later carried out post-graduate work at Columbia University. During his years with the company, Mr. Rowand has served in many engineering capacities and has been active in the design and development of boilers. He is the author of a number of technical papers and is prominent in the Metropolitan Section of The American Society of Mechanical Engineers.

C. C. Moore & Co. Distributors for Thur-Ma-Lox

Distribution of Thur-Ma-Lox, high temperature coating, was recently taken over by C. C. Moore & Company Engineers who have offices at Seattle, Portland, San Francisco, Los Angeles and Phoenix.

A product of the Dampney Company of America, Thur-Ma-Lox is a rust preventative designed for exposure to the atmosphere. Thur-Ma-Lox coatings give effective and durable protection to metal surfaces over a temperature range that may extend from sub-zero to extremely high heat. Number 7, black in color, provides a coating impervious to weather and industrial atmospheres, and Number 10, aluminum in color, is recommended for use only in sheltered locations.

Howard C. Hinig

Hinig Promoted

Howard C. Hinig has been promoted to assistant manager of industrial and transportation sales for The Sherwin-Williams Company of California.

Hinig joined Sherwin-Williams in January, 1936 as a clerk in the traffic department and two years later was transferred to transportation sales. He was in the transportation sales department until his recent appointment except for the period July, 1943 to April, 1947 when he was a first lieutenant with the U. S. Army Finance Department.

In his new position Hinig will have charge of coordinating the efforts of the various S-W factory points, salesmen and the company's Cleveland headquarters with transportation and industrial operations on the West Coast. He will be stationed at Oakland, California.

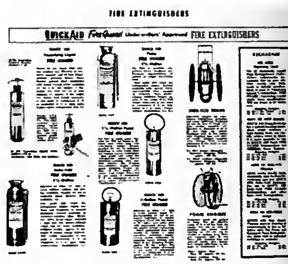
A native of Cleveland, Hinig attended Western Reserve University.

Fire Extinguisher Folder

The General Pacific Corporation has prepared a special file folder headed "Fire Extinguishers" that is available, without cost, upon request.

The two-color folder lists the classes of fires, the type extinguisher to be used for each class, and explains briefly and clearly the method of operating the various types of extinguishers. Pictures of General Quick Aid Fire Guards illustrate the chart. The outside of the folder illustrates and defines other types of General Quick Aid Fire Guards.

Of standard file size, this General Pacific folder provides a handy reference for fire prevention and valuable fire-fighting information.



Hydroleum

The Continental Asbestos and Refining Corporation, New York City, recently issued a new folder on Hydroleum, a liquid product applied by brush, which prevents rust, corrosion and pitting in hot and cold water tanks, boilers, pipes and practically all types of metal surfaces exposed to contact with steam, hot or cold water.

Hydroleum protected surfaces are said to be impervious to attack by oxygen and other harmful elements in steam, hot, cold, fresh or salt water. The product comes in two types, No. 1, used on surfaces exposed to contact with steam and hot water, and No. 2, used on surfaces exposed to contact with cold, fresh or salt water.

John F. Shea
Manager for Bethlehem's San Pedro Yard
(See opposite column below)

Asbestos Textiles

"Johns-Manville Asbestos Textiles" is the title of a new sixteen-page brochure just published by Johns-Manville Corporation. The brochure is printed in two colors and contains twenty-six photographs which show asbestos mining operations, carding and spinning machines and the various Johns-Manville Asbestos Textile products, including reproductions of ten popular styles of asbestos cloth.

The opening paragraphs of the brochure list many of the countless uses for asbestos textiles in industry and in the home, and point out the fact that new uses and applications for these versatile products are being discovered and developed every day.

The balance of the pages are devoted to detailed descriptions of asbestos roving, lap, yarn, cloth, clothing, safety curtains, tubing, cord, wick, rope, tape and oil burner wicking. The descriptive material on each asbestos textile product is accompanied by an easy-to-read table which gives the Johns-Manville specifications for that product.

William Wrigley was riding with a friend on a train from New York to Chicago. Said the friend, "Your chewing gum is known all over the world. Why don't you save the millions of dollars you are now spending on advertising?"

Mr. Wrigley thought for a moment and then asked, "How fast is this train going?"

"About sixty miles an hour," was the answer.

"Then," asked Wrigley, "Why doesn't the railroad company remove the engine and let the train travel on its own momentum?"—*The Standard.*

Fairbanks-Morse Engineering Conference

T. M. Robie, manager, Diesel sales division, Chicago, addresses Northern California, Nevada and Utah sales engineering staff of Fairbanks-Morse & Company. His subject was "New Model 48 Stationary and Marine Engineers." The meeting was held at Commercial Club, April 5, in San Francisco.

Bethlehem Announces New Sales Manager

John F. Shea was recently appointed manager for the San Pedro Yard, Bethlehem Steel Company, Shipbuilding Division.

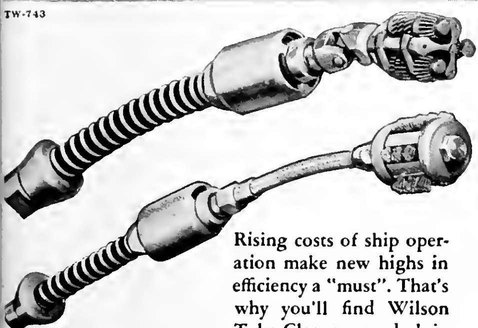
Shea joined the Bethlehem organiation at the San Pedro Yard as a sales engineer in 1941 and is widely known in shipping circles. He is a member of the Bilge Club, Society of Naval Architects, and the Propeller Club.

He was graduated in engineering from Santa Clara University in 1929.

AT SEA OR IN PORT

WILSON
TUBE CLEANERS
Cut Costs

TW-743



Rising costs of ship operation make new highs in efficiency a "must". That's why you'll find Wilson Tube Cleaners on deck in ports all over the world, ready to help improve boiler room efficiency two ways.

- **Faster turn-around in port when tube cleaning is necessary—fast-acting Wilson cleaners make short work of scales and deposits—get you back at sea in less time.**
- **Better heat transfer, new operating economies through more thorough, less frequent tube cleaning with Wilson equipment**

Wilson Tube Cleaners are available for straight or curved, ferrous or non-ferrous tubes from 3/8" I.D. to the largest ever cleaned. Call your local Wilson Representative to select the proper performance-proved Wilson Tube Cleaners for your fleet maintenance program. Please address Department

THOMAS C. WILSON, INC.
21-11 44th AVENUE, LONG ISLAND CITY 1, N. Y.
Cable: "TUBECLEAN," New York.

WILSON
TUBE CLEANERS

GETTY

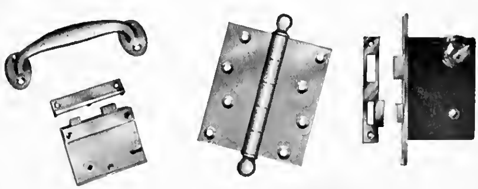
TRADITIONS OF THE SEA

1922 25th Anniversary 1947

No matter what today's industrial research brings forth in increased speeds, no matter what a product-hungry nation calls for in increased needs, hoary traditions of the sea, born in a harsher era, are still perpetuated. Traditions of sound design, unerring craftsmanship, absolute dependability, will always be paramount with us.

H. S. Getty & Co., Inc., has been creating fine marine joiner hardware for a quarter of a century; products proven in performance year after year. Skill born of experience is reflected in the quality and integrity engineered into every item which bears the Getty name. Only a few representative samples of the complete Getty line of marine joiner hardware can be shown here; but Getty quality continues to be a basic ingredient of every Getty product.

Getty has consistently produced marine hardware with the highest standards of quality through wartime and peacetime. In peace, as in war, danger sails ever with the men who man the ships; their security must be dependent upon nothing less than the best.



H. S. GETTY & CO.
INC.
3350 N. 10th St, Phila. 40, Pa.

Representatives

Ralston R. Cunningham Co., Inc. . . 73 Columbia St., Seattle 4, Wash.
George S. Lacy Co. . . . . 25 California St., San Francisco 11, Cal.
526 S. San Pedro St., Los Angeles 13, California

Martin and Turner Open House

To celebrate the opening of their new headquarters at 112 N. Avalon Blvd., Wilmington, the Martin and Turner Company, Marine and Industrial Supplies, held a most successful Open House. Reflecting the enjoyment of all who attended are the groups shown below.

Refrigeration Components Named EutecRod Distributor

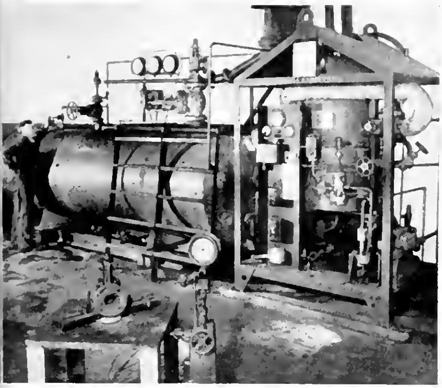
Fred Esser, owner of Refrigeration Components Company, 15 Steuart St., San Francisco, has been appointed exclusive refrigeration distributor of Weldrods for the Bay Area.

EutecRods have a new flux-coating containing metals and chemicals which improve the bonding at base metal heats. EutecRods weld brass, bronze, copper, aluminum, steels, cast iron and malleable iron in degrees ranging from 575° F. to 1600° F.

Upper picture: L. E. Menns, Bridgport Brass Co. (left) and James S. Martin of Martin & Turner.

Center picture: left to right: S. E. Shaw, Arnold J. Hanson, and W. Ray Culp, all of Pittsburgh Plate Glass Co.; Russ Turner of Martin & Turner.

Lower picture, left to right: J. L. McBride, Bethlehem Supply Co. of Calif.; Charles Menveg, Real Estate Agent; Stevedore Schlauger; Capt. Ostrander, P. Banning Young; Joe Hare, Maritime Commission; Russ Turner, Martin & Turner; Al Semnacher, Isthmian S.S. Co.; Fred Pate, Isthmian S.S. Co.



Have Your Safety Valves

OVERHAULED, TESTED AND SET FOR

ANY PRESSURE
ANY TEMPERATURE
ANY BLOW-DOWN

at the

Thomas A. Short Company

245 Fremont Street
San Francisco
SUtter 1-7622

Canvas

PRODUCTS

For every purpose

Specialists in Marine Canvas for a quarter century.

Life Boat Covers, Canvas Dodgers, Deck Gear Covers.

Call C. "Flags" Bennett, MIssion 7-3085

Courtesy purchase privileges on garden furniture and camping equipment

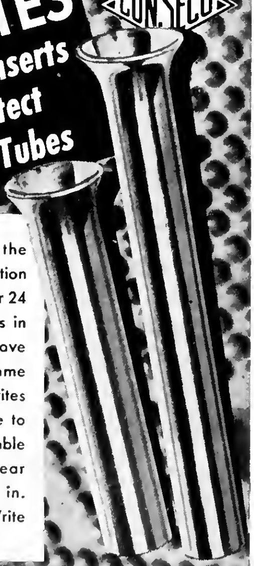
SULLIVAN *Canvas Products* INDUSTRIAL AND MARINE

AWNING COMPANY

101 SOUTH VAN NESS AVENUE • SAN FRANCISCO 10, CALIF. • MISSION 7-3085

CONSECO

Only FLOWRITES METAL Tube Inserts Really Protect Condenser Tubes



Only metal can absorb the erosive and corrosive action inside condenser tubes. For 24 years, millions of Flowrites in thousands of installations have proved this. Made of same metal as the tubes, Flowrites are non-breakable, simple to install, and easily replaceable when worn. Flowrites wear out, but your tubes stay in. Stocked in lengths to 26". Write or phone for details.

CONDENSER SERVICE & ENGINEERING CO., INC.

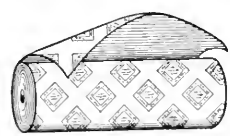
TERCO PRODUCTS CO. — *West Coast Representatives*
941 Howard Street, San Francisco 3, Calif.

TUBE CLEANING GUNS AND PLUGS
AIR AND EROSION ELIMINATORS
BEVEL GEAR UNIVERSAL JOINTS
STRAINERS, GREASE EXTRACTORS
WIZARD INJECTORS, FILTERS

...NSERS • LOW PRESSURE EVAPORATORS • AIR EJECTORS • HEAT EXCHANGERS • PUMPS

Specify QUAKER

for PACKING ECONOMY



EBONITE SHEET PACKING

Nonporous . . . withstands highest steam pressures. Will not melt, harden or carbonize . . . resists ammonia, air, oils, gases and acids. EBONITE will retain its life and flexibility after ordinary sheet packings have broken down. Quaker is the sole manufacturer of EBONITE.

REG. U. S. PAT. OFF.

QUAKER PACIFIC RUBBER COMPANY

SERVING ALL THE WEST

Los Angeles • San Francisco • Seattle

Factory: QUAKER RUBBER CORPORATION, PHILADELPHIA 24, PA.

Small Resigns From United Engineering

Commodore Lisle F. Small (above) and Raymond P. Hasenauer.

Commodore Lisle F. Small, president of the United Engineering Company, has resigned to become associated with the engineering division of the Lima-Hamilton Corporation, of Hamilton, Ohio, William P. Roth, Matson Navigation Company board chairman, announced. United is a Matson subsidiary.

During the last two years Commodore Small has been directly in charge of the work in connection with the completion of Matson's new *Lurline,* largest privately owned passenger liner under the American flag.

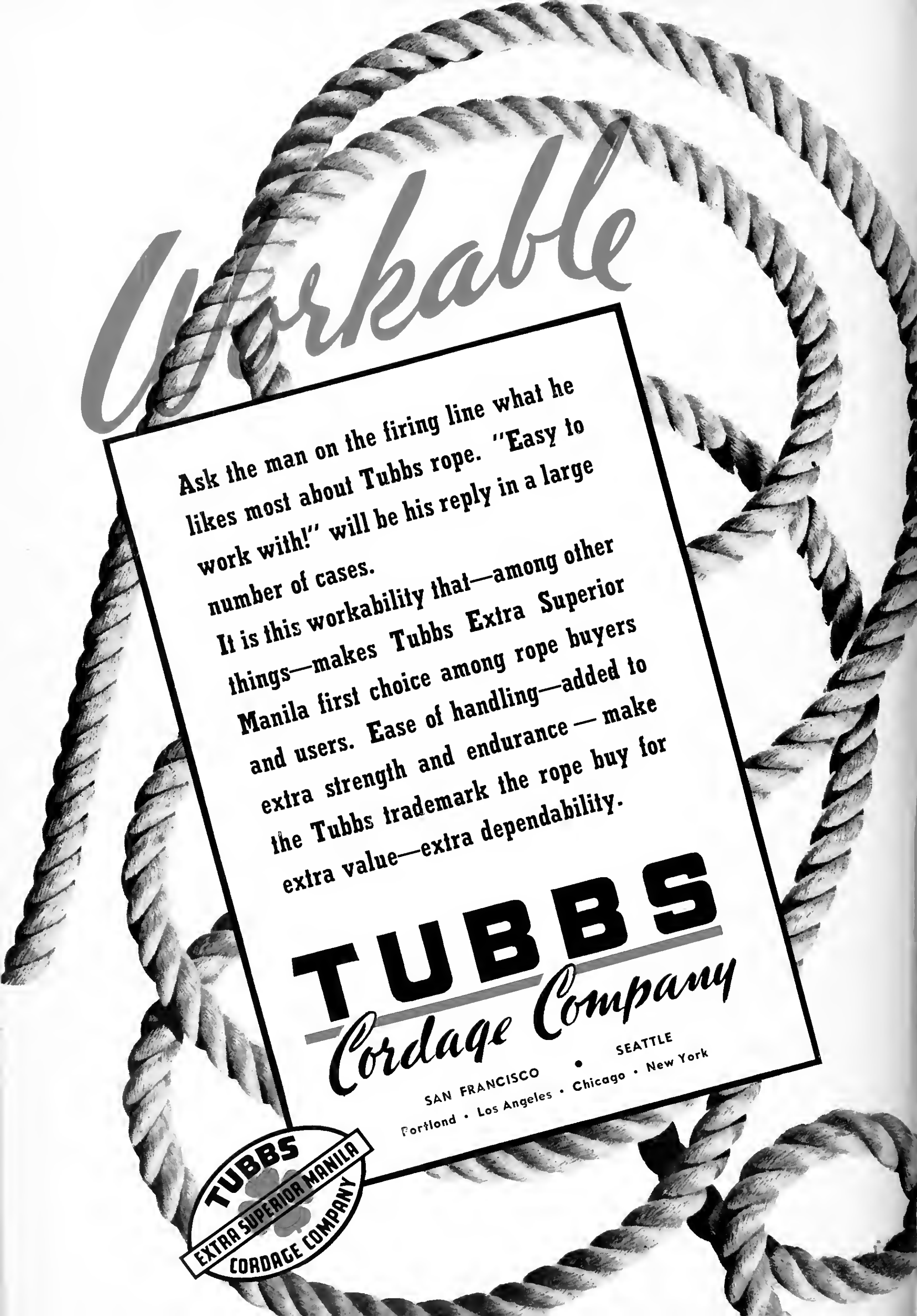
Commodore Small's resignation is effective April 30 and he will be succeeded by Raymond P. Hasenauer, treasurer of the Matson Navigation Company. Hasenauer served as president during the period preceding Small's appointment.

Adm. Biesemeier Joins Guralnick

Morris Guralnick, Naval Architect and Marine Surveyor of San Francisco, announces the advent into his organization of Rear Admiral Harold Biesemeier, U. S. N. (Ret.), who will specialize in marine surveys.

Admiral Biesemeier graduated from the United States Naval Academy, Class of 1918, and was an officer of the line for thirty years. In addition to the degree of Bachelor of Science from the Academy, he obtained degrees of LLB and LLM from the Law School of the George Washington Universtiy.

Admiral Biesemeier has been in command of submarines and destroyers, and during four of the recent war years, assault transports. In this time, he had many opportunities to prepare the specifications for and supervise upkeep work and damage repairs of naval vessels. He was Judge Advocate of the Pearl Harbor Court of Inquiry.


Workable
Ask the man on the firing line what he likes most about Tubbs rope. "Easy to work with!" will be his reply in a large number of cases.
It is this workability that—among other things—makes Tubbs Extra Superior Manila first choice among rope buyers and users. Ease of handling—added to extra strength and endurance — make the Tubbs trademark the rope buy for extra value—extra dependability.
TUBBS
Cordage Company
SAN FRANCISCO • SEATTLE
Portland • Los Angeles • Chicago • New York
TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY

Pacific MARINE REVIEW

. S. HINES
Publisher

. N. DeROCHIE
Assistant Publisher

. DOUGLAS MacMULLEN
Editor

. N. DeROCHIE, Jr.
Assistant Manager

AUL FAULKNER
Pacific Coast Advertising Mgr.

AVID J. DeROCHIE
Assistant Los Angeles

EORGE W. FREIBERGER
Advertising Mgr. San Francisco

LOS ANGELES OFFICE
3 Wilshire Blvd., Beverly Hills
lephone—BRadshaw 2-6205

SAN FRANCISCO
Telephone—GArfield 1-4760

Member Audit Bureau of Circulations

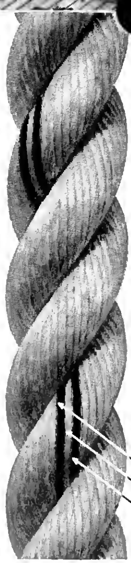
Subscription rates:

One year, $2.00; two years, $3.50; three years, $5.00; foreign, $1.00 additional per year; single copies, 25c.

TABLE OF CONTENTS - - - - - - - - JUNE, 1948

PUBLISHED AT 500 SANSOME STREET • SAN FRANCISCO 11, CALIFORNIA

For Hoisting Cargo, Hay, or Hods...



men who know choose COLUMBIAN ROPE

WHETHER you are in marine service—towing, loading, or fishing; farming or ranching; construction or other field . . . you'll find the rope that does your job best carries the red-white-blue markers of Columbian —the Rope of the Nation.

In selection and preparation of the fibers—manila, nylon, hemp, jute, or sisal; in waterproofing for durability and flexibility; and in producing with a lay that assures perfect balance . . . Columbian's knowledge and experience result in the rope that is right for the purpose.

Insist on Columbian . . . look for the red-white-blue surface markers (on sizes 3/4" and larger).

COLUMBIAN ROPE
400-90 Genesee St., Auburn, "The Cordage City", N. Y.

Columbian Rope

Panama Canal Tolls

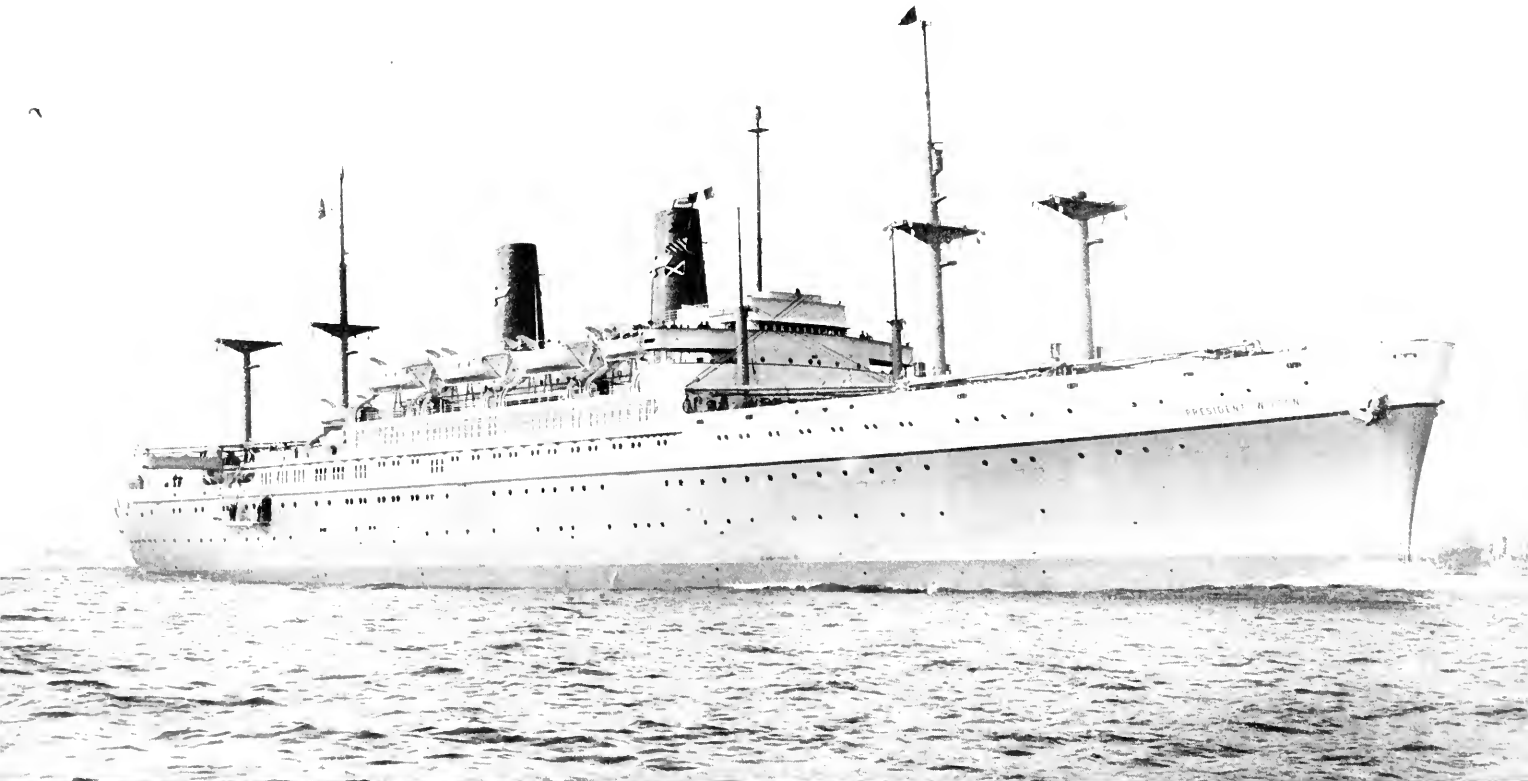
IT HAS BEEN SAID that a great many people think they are thinking when they are merely rearranging their prejudices. "Thinking" on the question of Panama Canal Tolls usually takes the form of pride in the honor and integrity of a nation that not only wants to be right in the administration of the Canal but to even *seem* to be right. This nod toward international ethics satisfies those who are willing to see a great industry destroyed rather than equalize the burden as between commercial and national defense categories of vessels.

We believe that without violating any legal requirement a good case can be made for the elimination of all tolls for intercoastal vessels. What is more, we believe that *even the spirit* of the Hay-Pauncefote treaty would be satisfied by such elimination. That treaty provided that all nations be treated equitably. Domestic traffic between ports of the United States could scarcely be the concern of other nations. Only American flag vessels are allowed by law to participate in the intercoastal trade so there is no possibility of discrimination against vessels of other nations in that movement. Forcing an American vessel to pay $15,000 for a round trip through the Canal seems like an unfair and destructive burden on our intercoastal industry, and just when the industry was almost "on the ropes" the President raised the rate of toll,—although the increase has been delayed for further review.

The Canal was not built to earn a profit, nor was it built to please commercial interests, although it has done both of these. Strategic and political motives following the acquisition of Hawaii, Guam and the Philippines prompted its construction and the cost was never intended to be a burden on commercial shipping. It *has* been such a burden, and continues to be, although the Canal has long ago justified its cost in defense economies alone. Without it, Naval expenditures would be higher—according to varied opinions—by from 300 million dollars to five times that figure *every year.* Commercial shipping is saving us from this vast expenditure by paying for the Canal's operation. This is, of course, just one more way in which the shipping industry lacks full appreciation from the public. On a par are depressed port rail rates, delays in restoring intercoastal and other vessels, cumbersome management of the Ship Sales Act, expecting the industry to carry the burden of defense equipment on its vessels, and other lacks which the Weichel Bills were intended to correct but which now seem due for further delay. Why must there always be months and years of delay in shipping matters? Seems that the present able Association leaderships took over just in time.

Panama Canal policy is vital to shipping and should be followed closely. The industry's contention that the Canal is at least as much military as commercial seems sound. On this basis a 40 per cent cut in tolls to 54 cents per ton (it is 90 cents now and the planned increase would bring it to $1.00), would still leave a safe margin over commercial operating costs. Military installations should not be charged to shipping, which is a first line asset in emergency.

Let us keep our Merchant Marine in trim; make-ready time exists only before an aggressor acts.



The President Wilson

—Bound for the Orient on Maiden Voyage

The President Wilson

The great new steamship *President Wilson* of the American President Lines was completed during April and sailed from San Francisco on May 1. The vessel's maiden voyage officially began at Los Angeles on May 8 when she set out for the Orient with 550 passengers. On the bridge was Captain Orel A. Pierson, Master, and Commodore of A. P. L.'s fleet.

The *President Wilson* was built at the Alameda Yard of Bethlehem, as were the *President Cleveland* and the group of P-2 transports during the war. The *President Cleveland* was well described in a 33-page feature article in the January issue of the PACIFIC MARINE REVIEW. The *Wilson* is similar to the *Cleveland* in every important respect, but there are many features that were held for greater elaboration in this issue.

Built for the U. S. Maritime Commission at a cost of about $22,000,000 the *Wilson* was laid down late in the war and launched in November, 1946. She has an overall length of 608 feet 5¾ inches, a molded beam of 75 feet 6 inches, and a scantling draft of 32 feet. Normal shaft horsepower is 18,000 with a maximum of 20,460. Normal sustained speed is 19 knots with an economy run estimate of 22 knots. Like all P-2s, the Wilson has dual engine rooms as a defense feature. Principal characteristics of the vessel will be found tabulated in the box on page 49.

A passenger liner is a first-class hotel afloat and self-contained. All her services must be maintained with a very high degree of reliability through her own machinery. In addition she must be able to move herself on definite schedules from one port to another, almost regardless of weather. She is therefore one of the most complicated structures devised by the mind of man and her functioning is dependent on a great number and great variety of mechanisms. These together with the furnishings and equipment give work to a great many artisans who are scattered all over the nation and who in many cases may never have seen a shipyard or even have seen salt water. The cost of a vessel is distributed over the whole country for labor and materials, to a greater degree than is true in any other industry. A partial list of vendors supplying the *President Wilson* indicates that it comes from 15 states, 5 of which are middle western states.

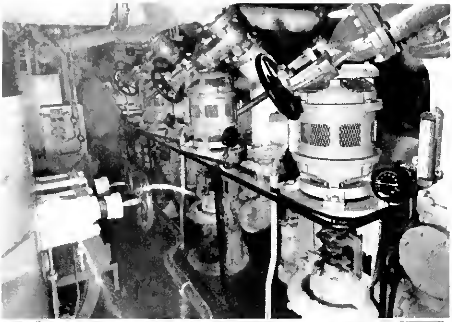
Hull Design and Construction

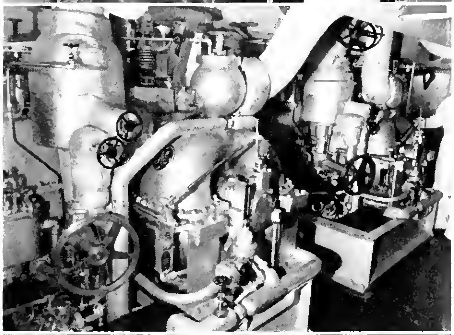
The basic hull design of these vessels was evolved by the U. S. Maritime Commission, Technical Division, and

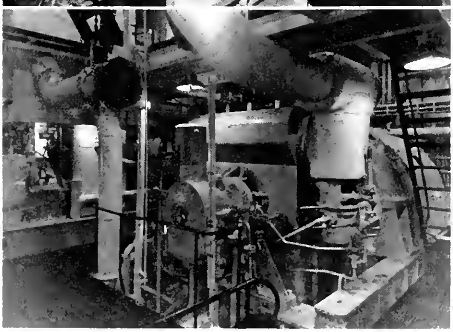
Mrs. George Killion and Mr. Killion. Mr. Killion is president of American President Lines.

altered by the Navy. All passenger accommodations and crew space arrangement and interior decoration design was produced by George G. Sharp, Naval Architect, New York. All joiner work, furnishing and interior decoration were installed and erected by the Aetna Marine Corporation.

The hull is of combined riveted and welded steel construction with a curved stem, a cruiser stern, and with three complete decks and a partial deck. These decks are designated A, B, C, and D. Above these are: an upper deck extending from the stem almost to the stern; a promenade deck extending from the stem to frame 168; a boat deck covering the midship house; and a navigating bridge deck. The midship house above the boat deck is of riveted aluminum construction which saves some 75 tons in weight at a position where weight saving is important. This use of aluminum is new in merchant ship construction although the Navy has used this metal on the superstructures of destroyers and cruisers with very satisfactory service results. In this work all rivet holes are drilled or punched to a diameter 1/16th inch less than that of the rivet. After assembly and packing, with every third hole bolted, the holes are reamed to a diameter







Top: Vertical Battery of Brine Pumps (Warren) in Air Conditioning Room.

Center: Close-up of GE Auxiliary Turbines.

Bottom: Another view of Main Turbine, After Engine Room.

1/32d inch larger than the rivet. Up to and including 3/8" diameter the rivets are driven and set up cold. Above 3/8" diameter they are driven hot.

All decks above A deck have both camber and sheer, A deck has sheer but no camber, decks below A have no camber and no sheer. As has been usual for some years in American passenger liners of this type, the promenade deck, in way of the house amidships, projects about 2 feet outboard from the hull, port and starboard. This serves the purpose of helping to keep boats clear of hull when lowering and allows the installation of flood lights under this overhang to illuminate the sea. It gives, of course, a wider promenade which is a decided advantage for passenger recreation and loafing space.

Several of the weather decks in the way of passenger accommodations are covered with Oregon pine decking 2 5/8" thick and 4 1/2" wide. Margin strakes on these decks are of teak 2 5/8" thick and the pine timbers are carefully nibbed into the teak at curved sections of the ship and around all deck fittings. Deck timbers were laid over a coating of Dex-O-Tex, a corrosion-prevention composition manufactured by Crossfield Products Corp., of Los Angeles, and all seams caulked with two strands of cotton and one of oakum payed over with marine glue.

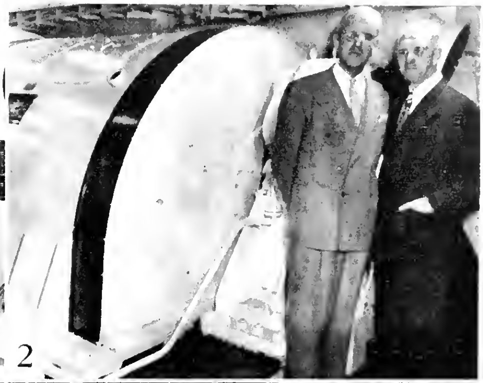
Provisions for air conditioning and ventilating are very complete. Air conditioning is provided: for all cabin and tourist class passenger staterooms; for a number of ship's officers staterooms and offices; for all mess rooms; for tourist and cabin class dining rooms; the library, waiting room, writing room, and shops; and for tourist, cabin, and officers' lounge rooms. Mechanical ventilation is provided for practically all the enclosed spaces on the ship. In general the air supply to all uncooled space is required to equal 30 cubic feet per minute for each occupant. In unoccupied spaces the air change varies from a complete change every two minutes in the battery room to a change every thirty minutes in dry cargo spaces, air supply to be for the gross cubic measure without benefit of deductions for furniture or other contents, and no space to receive less than 25c/m. Air conditioning machinery is supplied by the Carrier Corporation and the ventilating and air conditioning systems are equipped with Ilg fans. Air conditioning systems are served by heaters and cooling coils supplied by McQuay, Inc.

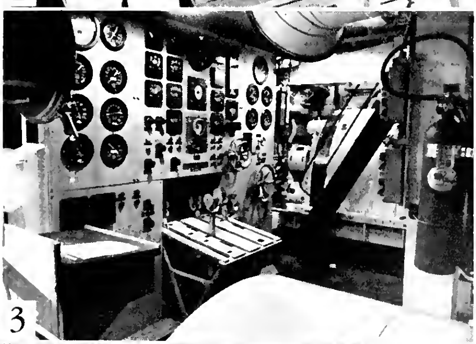
Deck Equipment

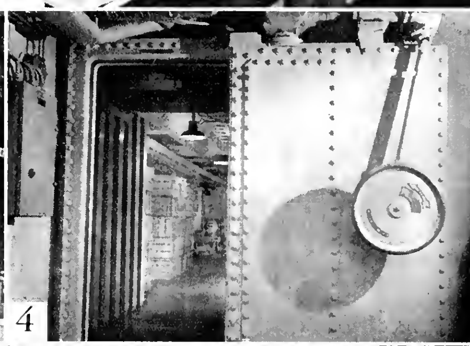
The electric drive Lidgerwood windlass is mounted forward on the promenade deck and is of the horizontal shaft, double wildcat, double gypsy type, the entire assembly including electric motor being installed above the weather deck. This equipment is capable of hoisting two stockless cast steel anchors each weighing 15,575 lbs. and two 165 fathom lengths of 2 5/8" NACO steel stud link chain, each weighing 11,630 lbs. at a rate not less than 30 fpm. Either gypsy head must have a line pull of 20,000 lbs. at a speed of 30 fpm. and a no load speed of not less than 75 fpm. The motor for this windlass is rated 125 hp 230 volts, approximately 600 rpm.

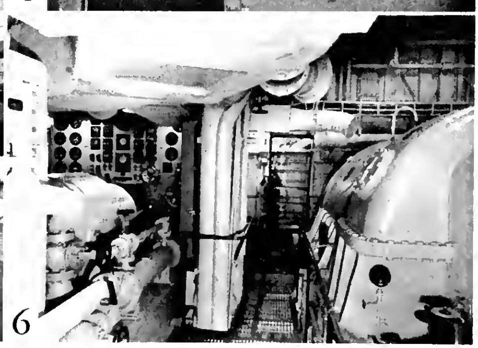
The steering gear is of the Lidgerwood hydro-electric double ram four cylinder Rapson slide type, located directly over the rudder on "C" deck. It is capable of mov-

1. The well-known Jack Paton, Chief on PRESIDENT WILSON
2. Two top Coast lubrication men snapped in After Engine Room: R. E. Burness and H. J. Bihler, of Standard Oil.
3. Main Control Board, Forward Engine Room.
4. Typical Watertight Door, Commissary. Controls are by Philadelphia Gear Works.
5. The Lakeshore Siporter in operation.
6. Engine Room Layout. Auxiliary Turbine Generators on left, main Turbine on right, all General Electric.





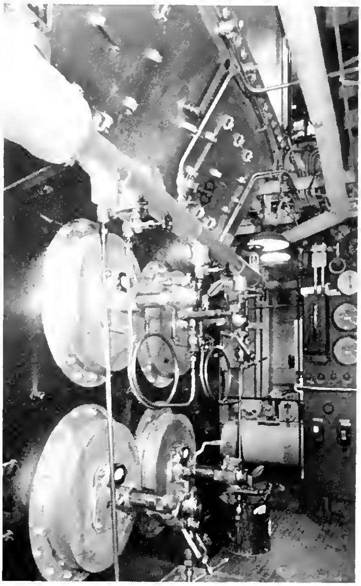




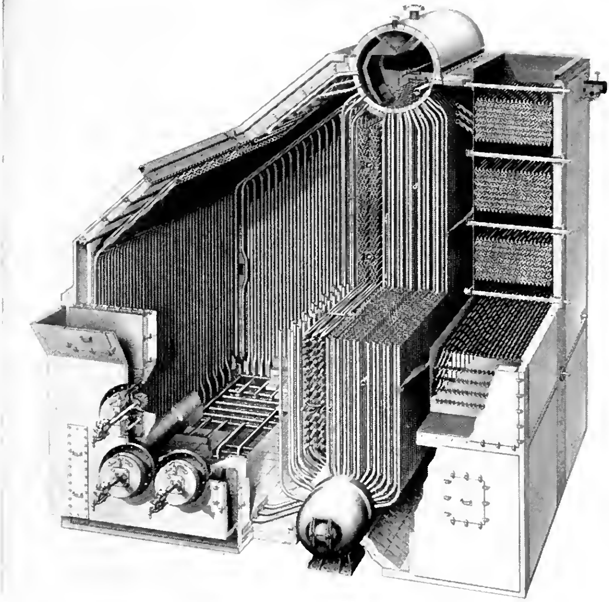
ing the rudder from hard over to hard over (70°) in less than 30 seconds when the ship is going ahead at a speed corresponding to the maximum designed shaft hp and at full load draft and in less than 60 seconds when going astern at 40 per cent of the maximum shaft horsepower. The rudder may be independently operated by either ram. The maximum working pressure ahead or astern must never exceed 1500 psi. The hydraulic pumps for these gears are in duplicate, each pump having capacity to handle the gear. Each pump is driven by a 50 hp 440 volt A.C., 3 phase 60 cycle motor operating at 1800 rpm. These motors may be controlled from four steering stations: a pair of trick wheels in the steering gear room; a mechanically connected after deck steering wheel station; the standard station in the pilot house; and a station on the pilot house top. At the last two the control is by hydraulic telemotor connection for manual steering, and by Gyro Pilot system for automatic holding to the course. Suitable switch-over arrangements prevent any interference between the steering systems.

Ten single drum and six double drum electric drive winches, of double reduction gear type are provided for cargo handling at the six hatches. These winches are driven by 50 hp d. c., 600 rpm, 230 volt motors, and are capable of handling: 1½ tons at 290 fpm; 3 tons at 220 fpm; and 10 tons at 56 fpm. They were manufactured by Lake Shore Engineering Co. with motors and controls by Westinghouse.

Two 24 inch vertical Lidgerwood capstans driven by 35 hp, 230 volt d. c. motors through gearing are each



Close-up of Combustion Engineering's boiler on President Wilson.



Cutaway view of one of the four Combination Engineering boilers, showing the interior arrangement of boiler tubes, superheater tubes, and economizer tubes.

capable of exerting a 20,000 pound pull at 30 fpm on warping or other hawsers. Motor and gearing are installed on deck below.

An interesting advance in the design of cargo handling machinery is the Lake Shore Engineering Co. side port loading-discharging crane for hatch No. 4 which tops on "A" deck. Two bridges each carrying one trolley and each capable of handling 2½ tons safely are installed for athwartship travel in unison. The travel of the bridges is served by a 10 hp motor; the travel of the trolleys by a 15 hp motor, and the hoist drums are operated by a 50 hp motor. The bridges at the limit of their travel have sufficient outboard projection to give the trolley 15 feet clearance from ship's side.

Another interesting item of cargo handling equipment is a pair of portable cargo oil pumps supplied by the Waterous Company. These are of the rotary type with herringbone reduction gears driven by Westinghouse 30 hp, 1800 rpm motors and each pump will discharge 350 gpm against 100 psi with 440 rpm of the pump rotors. These pumps are handled by three electric motor drive whip type hoists each with a capacity for lifting two tons at 25 fpm.

Two elevators by Otis are installed, one for passengers and one for baggage each capable of lifting 2000 lbs. at 100 fpm. The passenger cage travels from "B" deck to the promenade deck and the baggage elevator from "C" deck to the upper deck.

Navigating Equipment

The pilot house, navigating bridges and pilot house top are equipped with all the most modern devices for making navigation simple and safe.

Gyrocompass system includes one Sperry Mark XIV master gyrocompass and eight repeaters mounted and located as follows: steering type repeater on gyro pilot control stand in wheelhouse; steering type repeater on column stand on wheelhouse top; bearing type repeater on column stand at after steering station; bearing type repeater on column stand, port and starboard on bridge wings; bearing type repeater bulkhead mounted in master's office; steering type repeater bulkhead mounted in steering room; and repeater mounted in radio direction finder. An automatic course recorder of the gyrocompass repeater type in the chart room keeps accurate records of all courses.

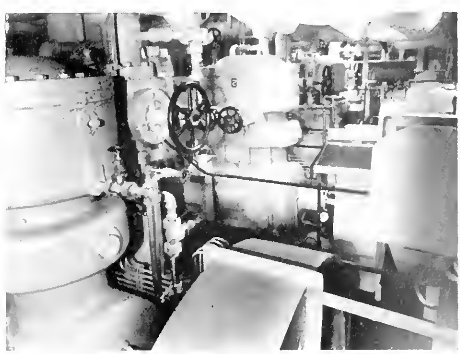
A Sperry gyro-pilot system provides complete and independent electric telemotoring for either manual or automatic control of the stroke of the main steering gear pumps. The control unit of this system is mounted in the wheelhouse.

A Submarine Signal Co. echo depth sounder provides visual and recorded reading of the depth of water under keel. This instrument has a range of from three fathoms

Principal Characteristics of President Wilson

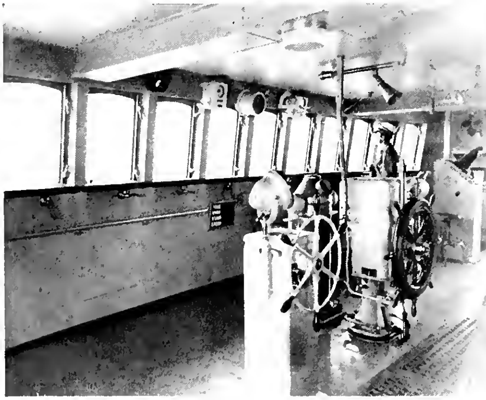
Length Overall	608′ 5¾″
" 32 Ft. Waterline	593′ 2 ″
" 29 Ft. Waterline	590′ 0 ″
" Bet. Perpendiculars	573′ 0 ″
Beam molded	75′ 6 ″
Draft subdivision	30′ 0 ″
Draft scantling	32′ 0 ″
Normal Shaft Horsepower	18,000
Sustained Sea Speed	19 knots
Depth Molded Promenade Deck	61′ 6 ″
Height Upper Deck to Promenade Deck	9′ 0 ″
" A Deck to Upper Deck	9′ 0 ″ at side
" B Deck to A Deck	9′ 0 ″
" C Deck to B Deck	8′ 6 ″
Crew including spares	352
Passengers (about)	550
Lightweight of ship including 700 tons fixed ballast	12,424 tons
Deadweight in long tons—	
Stores, passenger, crew and effects, and pools	545
Fresh water	388
Fuel oil	4,343
Cargo oil	762
Cargo oil heating water	114
Refrigerated cargo ... 500 @ 70 cf/ton	
General cargo	4,431
Total deadweight	11,093 tons
Total displacement at 30′-1⅞″ draft	23,507 tons

Three 50-ton Frick Machines for Cargo Refrigeration.

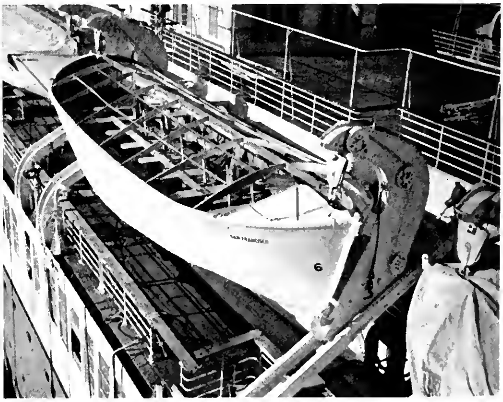


Tourist Lounge.

Good vision and light interior is maintained in wheelhouse by Kearfott windows.



Typical aluminum lifeboat and davit, by Welin.



up and its readings are accurate within 2 per cent.

Two systems of sound powered telephones are used. System A keeps the wheel house in communication with: the wheelhouse top; the chart room; the forecastle head; the crow's nest; the captain's office; the radio room; the stern capstan; the steering gear room; and the after steering station. System B connects the wheelhouse with: the foreward engine room operating station; the after motor room; the Chief Engineer's office; the emergency generator room; the steering gear room; and the electric distribution room. Voice tubes connect the wheelhouse with the radio room, the wheelhouse top, and master gyro room, and the captain's stateroom.

Port and starboard propeller shaft revolution indicators indicate the rpm and direction of rotation of each propeller. A waterproof mechanical seven digit counter and electrical transmitter are installed on each shaft and waterproof electrical indicators: at each engine control stand; on forward bulkhead above windows in the wheelhouse; and in the chief engineer's office.

A Navy standard magnetic compass with complete azimuth circle is mounted on top of wheelhouse; a standard magnetic steering compass and binnacle in the wheelhouse; and a standard magnetic steering compass at the steering station aft.

The Electronic Navigator, General Electric's equipment for radar navigation, is installed so that regardless of visibility the navigating officer is able to detect visually any approaching vessel or other floating object and any landfall in ample time to avoid collision or stranding.

The radio direction finder is the latest model of the Radiomarine Corporation of America and is located in the chart room.

A Leslie Tyfon whistle and whistle control with control stations in the wheelhouse and on the navigating bridge, port and starboard, is arranged for both electric and manual operation.

The ship's radio telegraph and relephone installation was supplied by R.M.C.A. and consists of four radio telegraph transmitters of various frequencies and four receivers of various frequencies covering all the regular and emergency requirements of a passenger liner radio service. A harbor type radio telephone tansmitter receiver takes care of ship to shore conversations in or near harbors. Each motor lifeboat is equipped with a radio telegraph transmitter and with a storage battery of sufficient capacity to operate this transmitter-receiver continuously for at least six hours.

In connection with the ship's radio there is an automatic alarm that responds to the ship's radio call letters and rings bells in the pilot house, in the radio room, and in the radio operator's cabin.

One broadcast and high frequency receiver is provided together with loud speakers in the mess rooms, the dining rooms, the lounges, the dance floor and in other public rooms to provide for entertainment of passengers and crew.

Safety Systems

A complete C-O-Two Fire Equipment Co. fire detecting and extinguishing system provides detection of smoke by eye, ear and nose through two cabinets in the

Top: First class stateroom of President Wilson. Two Arnot sleepers in down position.

Center: Open Arnot sleepers in first class cabin.

Bottom: Beauty shop on President Wilson furnished by Arnot Company.

First class writing room.

First class library.

wheelhouse which indicates the space from which the smoke comes and are combined with a carbon dioxide fire extinguishing system in the 51 spaces covered. These spaces include: cargo holds, cargo 'tween deck spaces, trunks to cargo spaces; and special cargo lockers; paint and lamp rooms, carpenter shop, engineer's paint locker and oil lockers; wiring trunks; provision and other store rooms. Separate C-O-Two systems are provided for the machinery spaces and for the gyro room, the projector booth film locker, the emergency generator room and similar spaces.

In each engine room a hose reel unit is installed having two 50 lb. carbon dioxide cylinders and sufficient length of flexible reinforced hose to reach any part of the space.

The special C-O-2 hose reel fire extinguishing equipment for the propulsion generators and propulsion motors was furnished by Walter Kidde and Company, Inc.

A complete water fire extinguishing system is served

Top picture: Veranda de luxe suite; bedroom is to the left.

Bottom: Cabin Class Stateroom.

Interior as well as weather decks of the new liner PRESIDENT WILSON have been covered with colorful Koroseal. The flooring in the Cabin Class dining room, pictured at right, is black, ribbed with quarter inch white lines at nine-inch intervals, running fore-and-aft.

1. Main lounge, the social center of the ship.
2. Stateroom, showing the Arnot bed combination and the all-purpose dresser chest which opens up to become a dressing table.
3. Marine veranda.
4. Cabin class smoking room.
5. Sitting room of veranda suite.
6. First class bar.

Ceilings are of Johns-Manville Marinite for acoustical control and fire-proofing.

by four horizontal centrifugal pumps, two in each engine room. Each of these pumps is driven by a 50 hp motor and has a capacity of 400 gpm against 55 psi or 225 gpm aganst 125 psi. This system has an 8-inch pressure gage located in the fire control room so that the watchman on duty there can see at all times that the necessary pressure is maintained. Fire hydrants and hose racks are installed so that any point may be reached by two separate hose outlets.

An electrical thermostat and annunciator system covers all spaces not protected by the smoke detection system, and this system rings an alarm and indicates space and zone affected on an annunciator panel in fire control room. Fire doors are fitted to stairway enclosures and to fire screen bulkheads. These are of the hinged self-closing type and can be released by electric control from the fire control room. A system of watchman's clocks monitors the watchmen and is supervised by the fire control room. Thus a man on watch in the fire control room can supervise all fire risks and extinguishing systems on the vessel and promptly apply the water or the CO_2 to the best advantage.

Watertight doors of the electrically operated horizontal sliding type are fitted between the motor rooms and the shaft alleys and between the motor rooms in the center-line watertight bulkheads. Same type doors provide access through the watertight bulkheads on "B" and "C" decks. These doors are controllable locally and from a central control station.

Refrigeration Machinery

There are thirteen refrigerated cargo compartments in each vessel with a total volume of 52,350 cubic feet. Estimated load for the total volume with each compartment maintained at the most severe conditions is 90.05 tons of refrigeration.

The nine ship service compartments have a total volume of 17,575 cubic feet.

In addition to the above there is the refrigeration load in connection with the extensive air conditioning system. Each of these is a separate system of the direct expansion Freon type.

All the machinery for these systems is installed in one

Official Changes in American President Lines

Streamlining the Company's executive structure to meet competitive postwar conditions, President George Killion of American President Lines announces the assignment of new duties for several high APL officials.

Killion's announcement was made following the meeting of the Board of Directors, which approved the streamlining appointments.

The Board also accepted the voluntary retirement of T. J. Cokely, Vice President-Operations, who is the oldest Company staff member in years of service.

The reassignments of duties are:

Col. John Kilpatrick, previously Assistant Operating Manager, has been promoted to Operating Manager, and will direct the work of the Operating Department, heretofore headed by retiring Vice President Cokely.

Eugene F. Hoffman, veteran Director of Public Relations, will assume the important and newly-created position of Passenger Sales Manager.

William H. Sharon, Industrial Relations Director, has been named assistant to E. Russell Lutz, Vice President for Foreign Administration.

In assuming his job as Operating Manager, Col. Kilpatrick brings with him the experience of nearly forty years in the shipping industry. He joined APL early this year and was formerly superintendent of the Water Division at the San Francisco Port of Embarkation. Other major positions he has held during his long career include the direction of Bush Terminal in New York and the Port of Embarkation in Los Angeles, both during the late war when he was a colonel in the Army.

Colonel John Kilpatrick, Operating Manager of A. P. L.

Ship to shore Radiomarine telephone.

compartment.

Serving them are the following pumps, supplied by the Warren Steam Pump Company, Inc.:

Three 5″ vertical centrifugal refrigerator condenser circulating; two 4″ vertical centrifugal chilled water circulating; three 3″ vertical centrifugal brine circulating; one 1½″ vertical centrifugal air conditioning hot water circulating; two 1½″ vertical centrifugal air conditioning hot or cold water circulating; one 2″ vertical centrifugal warm brine circulating and mixing; and one ¾″ horizontal centrifugal ice water circulating.

For cargo refrigeration there are three Frick Freon-12 systems, each compressor being driven by a d.c. 240 volt 100 hp Westinghouse marine type motor.

On the air conditioning load there are two Carrier systems each served by a Carrier multi-stage centrifugal compressor. One compressor is driven by a 150 hp 3 phase 60 cycle 440 volt a.c. Westinghouse marine type motor, and the other by a reduction geared steam turbine. This air conditioning refrigeration takes care of the cooling of air for the cargo hold air conditioning system in addition to the exetnsive air conditioning load for the passenger and crew accommodations.

Propulsion Machinery

The P-2 design is for turbo-electric drive and its most distinctive feature is the complete separation of its two power plant units and of its two motor units. Each power unit comprises two Combustion Engineering Company boilers generating steam at 600 psi and 840° F for a General Electric turbo generating set that has an output of 6890 K.W. at 3500 volts, 3 phase 60 cycle at 3600 rpm and supplies this current to a synchronous propulsion motor normally rated 9000 shp at 120 rpm and with a maximum capacity for 10,000 shp at 124 rpm—3610 volts. Each generator is normally at full power direct connected to one of the motors giving a normal shaft horsepower of 18,000 on the twin screw propellers or a maximum rating of 20,000 shp.

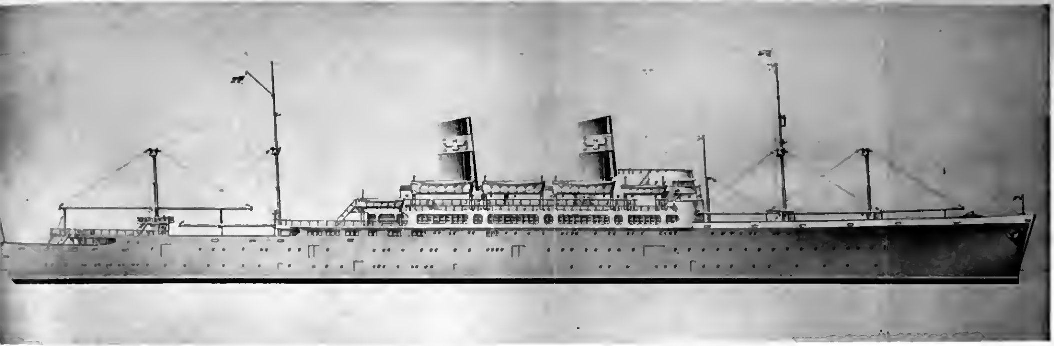
In each engine room there are two General Electric five unit turbo-generating sets. Each set consists of a steam turbine rated 600 K.W. at 10,033 rpm connected, through an enclosed reduction gear, to a 500 K.W. 450 volt 3 phase 60 cycle 1200 rpm a.c. generator, a 200 K. W. 3 wire 240 120 volt 1200 rpm d.c. generator, and a booster exciter 750 amp. at 100 volts 1200 rpm. The a.c. generators supply power for general auxiliary ship's service. The d.c. generators supply excitation current for the propulsion generators and the propulsion motors.

The boilers in each engine room are served by Hagan Automatic Combustion Control equipment that maintains a constant steam pressure and the correct fuel and air ratio for complete combustion of fuel. Todd Hex-Press oil burners take care of correct atomizing of the fuel. Copes thermostats mounted at the front of the boiler drum operate the feed water regulating valves. Reliance water gages are used to indicate the water level. In each boiler uptake there is installed a Wagner smoke indicator. In each boiler 10 Diamond Soot Blowers are fitted—three in the superheater section, two in the small boiler tube bank, and five in the economizer. Three Crosby safety valves protect each boiler, two in the drum and one at the superheater outlet. All the miscellaneous valves used in these boilers are Edward with EV alloy seats. Furnished with the boilers for cleaning the interiors of tubes are Wilson pneumatic turbine drive tube cleaners.

Specifications call for a maximum consumption in each boiler of 3002 lbs. per hour of 18,500 B.T.U. oil. That would be 12,028 lbs. per hour for all four boilers which figures at close to 0.66 lbs. of oil per brake horsepower hour for propulsion or something like 0.635 lbs. per shp hour for all purposes. This indicates a very high boiler efficiency and also the importance of the steam generator in low fuel consumption per unit of power. The sides and rear of the furnace space are lined with 2″ waterwall tubes. On the uptake side there are three rows of these 2″ tubes, back of which are the superheater elements which are held in position by two sets of alloy support castings clamped at each side to two pairs of 2¼ inch support tubes. Back of the superheater is a bank of 1¼ inch boiler tubes. Two baffles and a partition plate direct the flow of the hot gases up through the superheater elements down through the bank of 1¼″ boiler tubes, and up through the economizer. The feed water enters the economizer at the top and emerges at the bottom on its way to the boiler steam drum. An economizer is thus a last stage feed water heater utilizing the heat left in the combustion gases from the boiler furnace.

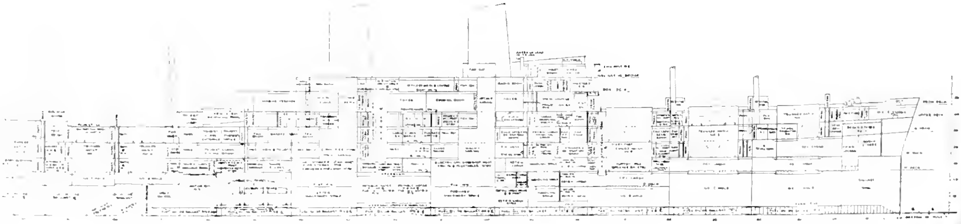
A forced draft blower is provided for each boiler. This blower takes its suction air from the machinery space and delivers it to the furnace front of the boiler through an air preheater which is heated by 75 lbs. steam bled from the main turbines. This pre-heater raises the combustion air from 100° F to 280° F.

Two fuel oil service pumps each capable of serving both boilers are provided in each engine room. These pumps take suction from the fuel oil settling tanks and

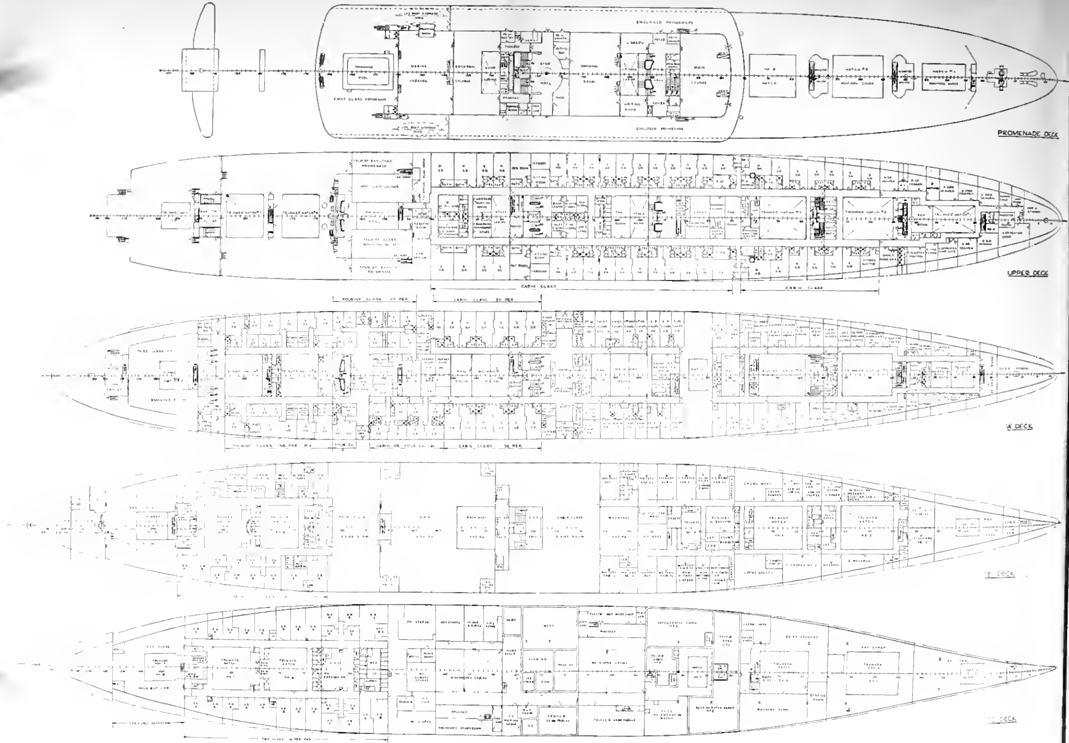


PRESIDENT WILSON—Artist's Conception

Below-Inboard Profile
Reverse Side of this Sheet-Deck Plans



INBOARD PROFILE


PROMENADE DECK
UPPER DECK
'A' DECK

deliver it to the burner headers on the boiler fronts through the fuel oil heaters. Three of these heaters are provided in each engine room. Any two are capable of heating 6500 lbs. of Bunker C fuel oil per hour from 100° F to 230° F when supplied with steam from the contaminated evaporator at 50 psi gage. The water drains from all oil heaters are pumped to the contaminated evaporator where they are heated to wet steam at 100 psi by desuperheated steam at 250 psi. As will be noted in the trial results herewith, the steam generating plant exceeded specified performance.

Steam from the boilers comes through a short pipe lead to the main turbine in each engine room at 590 psi 815° F total temperature for normal operation at 9000 shp and at 585 psi 845° F total temperature for maximum output at 10,000 shp. The turbines are of the General Electric impulse reaction type. Each turbine is mounted over and exhaust directly into its condenser which is of capacity to maintain a vacuum of 28.75 inches hg when its unit of the propulsion machinery is developing 9000 shp ahead with normal extraction from the turbine. Condensate and feed water system is of the closed type and follows the U. S. Navy-Maritime Commission flow type that has become practically standard on marine turbine drives. There are two condensate pumps to each condenser. The suctions of these pumps connect to the hot well under the condenser. This discharge is through the intercondenser of the main air ejector, the drain cooler, the gland cooler, the after condenser and the first stage heater to the deaerating heater. From the deaerating heater one of the two main feed pumps takes the feed water and discharges it through the economizer to the steam drum of the boilers. Each auxiliary condenser is served by a similar condensate and feed system discharging to the deaerating feed heater. Arrangement of piping and tankage in each engine room provides for feeding of boiler compound into the feed pump discharge.

Each main generator is equipped with a totally enclosed ventilating system having fans integral with the generator rotor. The air coolers are mounted below the generator frame. Cooling water is forced through the tubes of these coolers by a motor driven pump and the capacity is such that at maximum power requirement the ventilating air must be kept at 40°C when the circulating water enters at 85°F. The same type of ventilating system with the same requirements is used on the propulsion motors with the exception that the fan is external and operated by a separate motor.

A main control panel in each engine room adjusts the circuits between each main generator and its corresponding propulsion motor. These panels are of the dead front type. Combined with transfer panels in the motor rooms these panels make possible any workable combination of generators and motors.

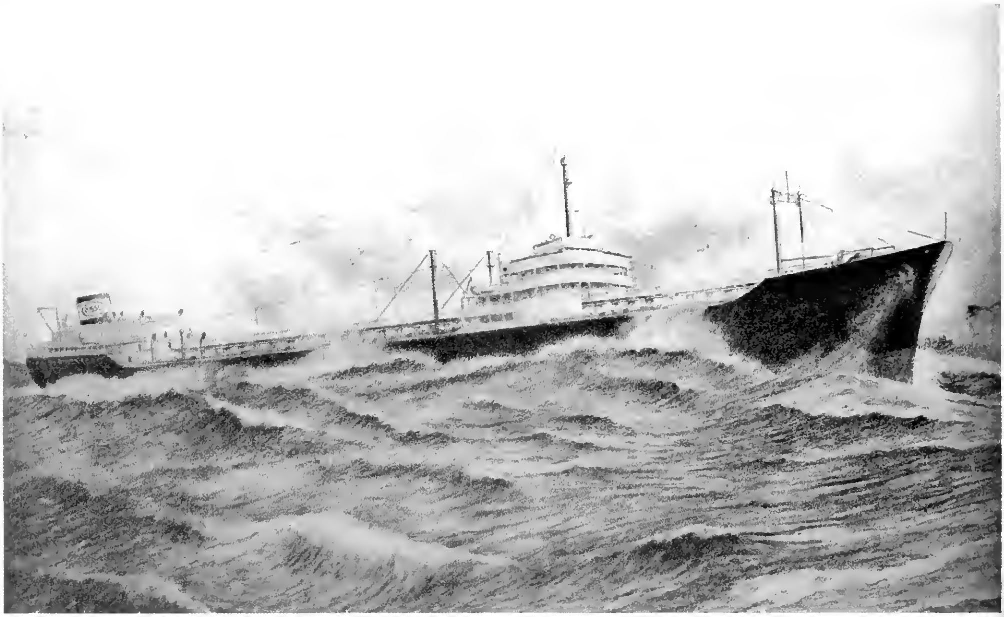
The J. O. Martin Company furnished some 52 King gages on several panels in convenient locations in the engine room which permit accurate centralized reading of the quantity of liquid in the fresh water, lube oil, diesel oil, fuel oil and gravity tanks. The gages not only eliminate the daily necessity of taking soundings at each individual tank but the system is so designed that accurate remote readings can be had on tanks which cannot otherwise be measured with a tape, rod, or float device because of inaccessability of the soundings tubes. The gages are located near the pumps or valves which fill the tanks so that for taking bunkers, and for trimming the tanks when loading or at sea one man can accomplish this work from a centralized King Gage panel.

With the exception of the main feed pumps and a few stand-by pumps practically every auxiliary machine on these ships is motor driven. All of the auxiliary power circuits and lighting, cooking, and heating circuits are distributed from the switchboards in the main engine rooms through a panel board system. The panel boards, the motor controls and practically all of the motors in these systems are supplied by Westinghouse.

An interesting installation in each engine room is the low pressure distilling plant built at Bethlehem's Fore River plant. Each of these plants will produce fresh water for boiler feed and for domestic purposes at the rate of 40,000 gal. per 24 hours.

Clean oil for turbine lubrication is insured by De Laval centrifugal oil purifiers of the latest type installed in each engine room.

He could smile at last! Tom Ingersoll, Manager, Bethlehem's San Francisco Bay Area Shipyards. The big job was done.



SIZE—POWER—STRENGTH
A striking conception of Esso's 628' super tankers, now under construction.

The Giant Tankers

The sudden emergence of the giant tanker construction program as the major ship construction news of the year has aroused great interest on the part of the oil companies' shipyard operators, tanker officers and crews, and the Maritime industry as a whole.

There are several sizes currently being built or planned with a possibility of even greater size for the near future. The 26,000-ton and 28,000-ton sizes have reached a point where plans and specifications are being released and they will appear from time to time in the PACIFIC MARINE REVIEW. A proposed 30,000-ton ship has not passed the discussion stage. The length varies somewhat at around 620 feet and the beam around 84 feet.

In the planning of these ships the use of the experimental towing tank has played a new and important part. The Stevens Institute tank was used for the vessels of the Standard Oil Company of New Jersey and Gulf Oil and five models were required in the tests to determine which of several bow designs was the most efficient. Towing tank and model basin technique is being found well worthwhile for even very small vessels including tugs and barges.

Sun Shipbuilding and Dry Dock Company, which is having an important part in the construction program, had to reconstruct its shipways on the land side in order to accommodate the great length of the tankers.

Contracts for the construction of six new 26,000 D. W. T. tankers, having a carrying capacity of 228,000 barrels of high gravity cargo, have been signed by Standard Oil Company (New Jersey), two of the ships to be built by Sun Shipbuilding & Dry Dock Company, Chester, Penna., and four by Newport News shipbuilding and Dry Dock Company, Newport News, Va. The vessels will be built from designs prepared by the Marine Department's technical staff. Each ship will have a normal complement of about 50 officers and men.

Dimensions and Particulars

Length, overall	628' 0"
Length, between perpendiculars	600' 0"
Breadth, molded	82' 6"
Depth, molded to upper deck at side amidships	42' 6"
Designed load draft, molded	31' 5"

Displacement, total, at designed load draft, about.. .	34,100 Tons
Deadweight at designed load draft, approx...	26,000 Tons
Normal Shaft Horsepower	12,500 at 112 r.p.m.
Speed, on trial, approx..	16 Knots on designed load draft

The vessel will have a rounded curved stem, a merchant cruiser stern, a vertical mast for radar and radio antennae and a raked streamlined stack. The propelling machinery spaces will be located aft, consisting of engine room and boiler room, separated by a watertight bulkhead. The boiler room will be on a raised flat aft of the engine room. The hull will be of the single deck design, with forecastle, poop, and bridge deckhouse, all connected together by the usual fore and aft walkways at the center of the vessel. The upper deck will be the strength deck and will extend from stem to stern. There will be ten main cargo oil tanks, each divided into three separate transverse compartments by twin longitudinal bulkheads, providing thirty main cargo compartments. Cofferdams will be provided at the extreme ends of the cargo oil tanks.

The cargo oil pumproom will be located at the aft end of the aftermost center oil tank and adjoining the engine room. A small pumproom for ballasting purposes will be located forward at the center of the vessel and adjoining the forward center cargo oil tank.

Fuel oil settling tanks will be located at the forward end of the engine room extending from the top of the main pumproom to the upper deck between the twin longitudinal bulkheads. Deep fuel oil storage tanks will be located port and starboard at the forward end of the engine room, outboard of the settling tanks. The double bottom under the machinery space will be arranged for reserve feed water. Potable water tanks will be provided aft at the poop deck level, and one in the upper deck enclosure amidships. Deep fuel oil or water ballast tanks will be provided under the second deck in the forehold.

Kingposts

For handling the cargo hose two steel kingposts, one port and one starboard, will be located immediately aft of the midship superstructure, provided with steel booms of three tons capacity. The spaces in the forehold above the second deck will be arranged for package freight, served through cargo hatches by twin steel kingposts with a five ton boom at the forward side of each kingpost. For handling ship's stores there will be two steel kingposts aft on the poop, each having one two ton boom. The stores will be loaded through cargo ports into the poop.

Accommodations

All officers will be berthed in the midship superstructure and petty officers and crew in the poop. Accommodations for Captain and Chief Engineer will consist of suites containing stateroom, office and private shower and toilet. Other licensed officers, and Purser, Steward and Radio Operator, will each have a stateroom with private shower and toilet. An officers' recreation room will be provided in the midship house, while the officers' mess will be conveniently located in the poop. petty officers and crew will be berthed generally not more than two persons per room, with either a private shower and toilet or connecting shower and toilet for adjoining rooms. There will be separate petty officers' and crew's messrooms and a comfortable recreation room for both. An engineers' dayroom, hospital, laundry and usual ship's service rooms will be provided. The galley will be electrically equipped.

Accommodations on the bridge deck will be provided for four passengers in two rooms, each with a private shower and toilet. The accommodations throughout will be of fireproof construction and mechanically ventilated.

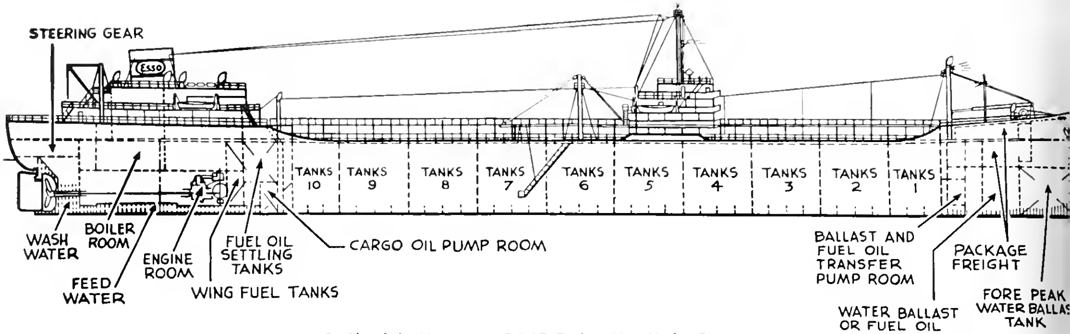
The fire fighting and safety appliances provided will be of the usual high standard existing in Esso fleet tankers. Four 24-foot, 35-person metal lifeboats, two aft and two amidships, will be part of each vessel's lifesaving equipment. The boats will be suspended from mechanical davits.

Machinery

The propelling machinery will consist of a geared turbine propulsion unit with cross-compound impulse type steam turbines and a double reduction gear. The cross-compound turbines consist of one high pressure ahead turbine and one low pressure ahead turbine with an astern turbine incorporated in the exhaust end of the low pressure turbine. Multiple hand operated valves are used for control of the number of the first stage ahead nozzles to obtain improved steam economy for part load operation.

Reduction Gears

The two turbine rotors are connected to the high speed pinions through flexible couplings of the high speed gear tooth type. The double reduction gear has the high speed first reduction elements placed forward of, and above, the low speed reduction element. The two high speed pinions drive two intermediate gears, connected through a flexible coupling to a low speed pinion. The two low speed pinions drive the low speed gear. Double helix design is used for all the reduction gear elements. The main thrust bearing, housed in the forward end of the reduction gear casing, is of the



Profile of the New 26,000 D.W.T. Tankers Now Under Construction

pivoted segmental, single collar, marine type, and is arranged to take the thrust in both directions. The ahead power and RPM for the unit are:

Power and RPM	*Rated*	*Maximum*
Shaft Horsepower	12,500	13,750
Propeller RPM	112	115.7

The propelling machinery is designed for reliable and economical operation at an estimated fuel consumption of .52 pounds of bunker fuel oil per shaft horsepower per hour when developing about 12,500 S.H.P. and not heating cargo, ballasting or tank cleaning.

The turbines are designed to operate at normal steam condition of:

Steam pressure at turbine inlet, lbs./sq. in. gauge... 835
Steam temperature at turbine inlet, degrees F 840
Exhaust back pressure at turbine exhaust flange, in. Hg abs.... 1½

Boilers and Condensers

Two Babcock & Wilcox watertube two-drum air incased boilers will be located on a flat aft of the main propulsion unit. Each boiler will have furnace water walls, convection type superheater, desuperheater, economizer, air heater, mechanical atomizing oil burners, smoke indicator, air operated feed water regulators, combustion control, air puff type soot blowers and other accessories required for economical operation.

There will be a main condenser serving the main propulsion unit and turbo generators, and capable of maintaining a vacuum of 28.25" Hg, located under the main low pressure turbine. An auxiliary condenser is provided to condense the exhaust steam from the two turbo generators, cargo pump turbines and other steam actuated auxiliary machinery units. The auxiliary machinery which has been arranged to ensure reliable and economical operation includes three steam turbine actuated rotary feed pumps, main and auxiliary circulating and condensate pumps, main and auxiliary condenser air ejectors, lubricating oil service pumps in association with a gravity type lubricating oil system for the main propelling machinery, a steam turbine actuated fire and Butterworth pump with heater and drain cooler, a reciprocating general service steam piston type bilge and ballast pump, an electric motor actuated centrifugal fire pump, sanitary pump, two wash water pumps, two drinking water pumps, two Freon refrigerating machinery units, complete with condensers and cooling water pump, and engine room bilge pump, reciprocating type.

The feed heating system will be provided with four stages of feed water heating including a deaerating feed water heater. The evaporating plant will include two salt water evaporators and one make up feed evaporator and two distillers.

The boiler forced draft system will include two electric blowers equipped with vane control. Each boiler will have four fuel oil burners, served by two fuel oil service pumps and heaters in conjunction with Bailey combustion control equipment. Air puff type automatic control boiler soot blowers will be supplied with air from two large air compressors; a small compressor will furnish air to the combustion control system and feed water regulators.

Electrical Installations

The electrical installation will include two 400 K.W., 450 Volt, 60 Cycle, 3 Phase, A.C., steam turbine generators on a flat at the starboard side of the engine room. These generators will operate on a steam condition, same as that of the main propulsion turbines. In addition, there will be transformers for the lighting services and galley ranges and two motor generators for supplying direct current service. A 60 K.W. Diesel generator, 450 Volts, A.C. current, will be provided for emergency lighting services and for use with the boiler cold starting system, having emergency forced draft blower, fuel oil service pump and feed pump.

A lathe, drill press and grinder will be provided in the workshop which is located aft on the boiler flat.

The deck machinery will include an electro-hydraulic steering gear of the two ram type, a steam windlass and five steam winches.

The engine and boiler room will be ventilated by eight supply and exhaust propeller type fans located in the ventilators.

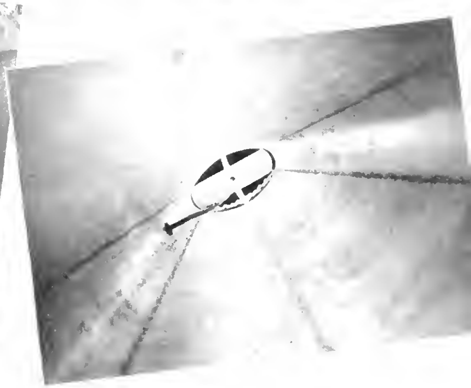
Pumping Equipment

The cargo pumproom located between the aftermost cargo tank and the engine room will contain four two-stage centrifugal cargo pumps, driven by steam turbines located in the engine room; these four pumps will be capable of discharging about 22,000 barrels per hour of 30° A.P.I. crude oil. Also in the main pumproom will be two steam reciprocating stripper pumps, and one rotary type stripper pump driven by an electric motor located in the engine room; each stripping pump has a capacity of 1,000 barrels per hour against a discharge

(Please turn to page 67)

LEFT Hand hol... ar ...ach joint facilitate the riveting of sections and the assembly of rigging fittings.

BELOW Looking up the inside of the aluminum mast. Note the tube used for installation of electric cable.



...) Full length view ...luminum mast fabri...d the plant of The ...er Brush Company, ...rtford, Connecticut.

...H Close-up show... ...doubler and tool used ...bucking up rivets ...re sections of mast are joined.

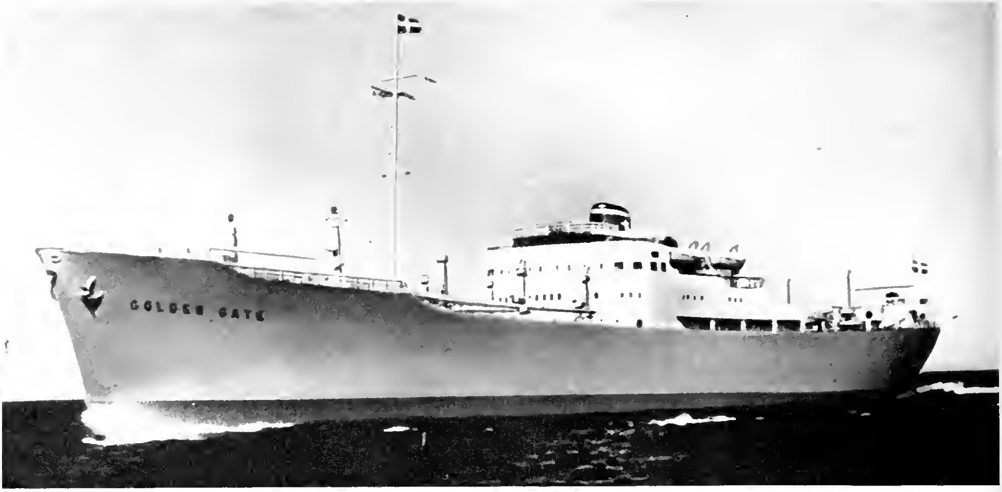
Aluminum Mast

CONSTRUCTED of Alcoa Aluminum drawn tubing, this 74-ft., 5⅝-in. mast was built in the plant of The Fuller Brush Company, Hartford, Connecticut, for Mr. Howard Fuller's yacht, "Gesture." Weighing 756 pounds, including all fittings, with the center of gravity 28 feet above the deck, the aluminum mast weighs about 180 pounds less than the original wooden mast and lowers the center of gravity exactly three feet, seven and one-half inches.

The mast was built in three sections riveted together over doublers. The doublers were made from two halves of the original tubing, flush riveted. The taper in the top section was produced by cutting a V-shaped strip, eleven feet long, out of each side and pinching the head of the mast together. This cut was then closed by welding.

Officials of The Fuller Brush Company state that the aluminum mast produces a noticeable improvement in the stability of the yacht, and, due to better air foiling, less wind resistance is offered than with the former mast. Because of its success and the success of another smaller one built for Mr. Avard Fuller's boat, "Eroica," The Fuller Brush Company has announced the commercial production of these lightweight masts, made of Alcoa Aluminum.

Fitted with her new aluminum mast, the "Gesture" is shown under sail.



The Golden Gate

SECOND IN THE JOHNSON LINE'S SERIES of postwar cargo ships, the streamlined *Golden Gate* is reputedly the fastest cargo vessel in the world. Preceded by the *Seattle* which was featured in the February PACIFIC MARINE REVIEW, the *Golden Gate* will be followed by the *Los Angeles* which is expected to be ready in August, and two more in the series as soon as the capacity of the shipyard permits. All the vessels are intended for Europe-North Pacific service.

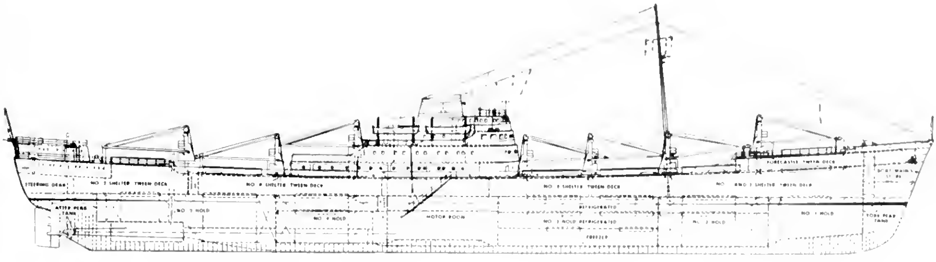
The 9,100-ton, 502-foot speed queen averaged the outstanding speed of 21.4 knots in trial runs in Swedish waters and bettered that speed under full power. Fully loaded, she has a cruising speed of 19.5 knots. The *Golden Gate* was built for the Johnson Line by the Kockums Shipyard in Malmo, Sweden.

Embodying the latest structural improvements, the *Golden Gate* and her sisterships are designed to provide maximum economy in running costs. Important among these is the efficiency in loading and unloading cargo. Instead of the old type derrick boom, the ship has fourteen specially constructed electric cranes, each with a reach of 41 feet and a capacity of from two to five tons. On some hatches, a combination of two cranes provides a 10-ton lift. The cranes are also adaptable to other jobs such as hoisting engine parts out of the ship or handling lifeboats. The after mast was eliminated in order to provide more space for the operation of these cranes. The foremast has no other function than to support the lantern, aerial, radar, etc.

Seven hatches instead of five make it possible for a

In a ceremony that is believed without precedent on the Pacific Coast, the Junior Chamber of Commerce Committee of the San Francisco Bay Area Council, representing Junior Chambers of Commerce from the entire bay area, presented a complete sterling silver service set to the motorship GOLDEN GATE when the resplendent new Johnson Line motorship arrived in her namesake's harbor on Sunday, May 23.

Left to right: Captain Swen A. Lagerberg, owner's representative on the Pacific Coast; Chief Engineer S. Strandberg, Captain C. O. Homberg, master of the Golden Gate; Fred L. Doelker, Pacific Coast manager of the Johnson Line, and James E. Lash, acting chairman of the Junior Chamber of Commerce, Bay Area Council.



Longitudinal cross-section of the GOLDEN GATE.

larger number of cargo-handling gangs to work simultaneously, thereby reducing time in port. Scientific placement of deck fittings and rigging further accelerate loading and discharge as does the elimination of stanchions to the greatest possible extent. Hold trimmings are largely vertical and all holds are provided with permanent light fixtures. Shifting beams in the regular holds move on ball bearings in the same plane as the hatch so that cargo can be reached without lifting beams.

The six refrigerated holds on the *Golden Gate* have a total volume of 95,000 cubic feet and two of them are suited for storage of deep-frozen products at —20°C., which is —4°F. Only a small number of fixed ventilators of the ordinary type are installed. Motor driven fans located in deckhouses on the fore and after decks ventilate all holds, and the holds are provided with devices for extinguishing fire in the cargo. Radar and autopilot are included in the modern aids to navigation provided on the ship.

The vessel is propelled by two double acting Diesel engines developing together 14,000 shaft horsepower at 110 revolutions per minute.

Located amidships, the galley is finished in stainless steel and is equipped with the most up-to-date electric appliances, electric ranges, baking ovens and refrigerators. There is also a laundry with washing and ironing machines and a drying room.

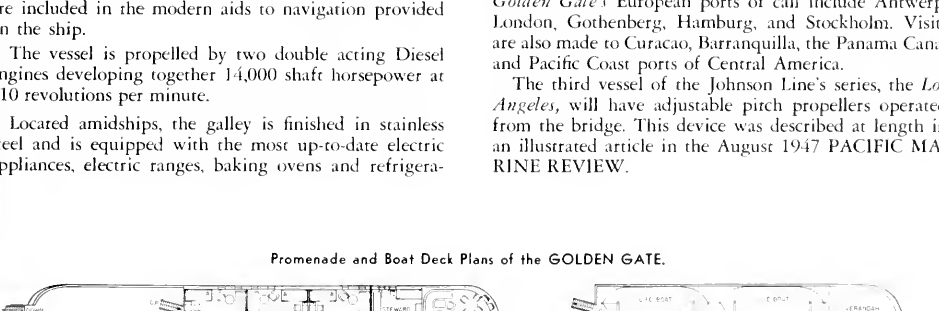
The hull is all-welded; frames are welded to the plating, and beams to the deck. The double bottom is also welded all around and is provided with extra docking keels, which enable the ship to be docked with a couple of thousand tons of cargo on board. Reinforcement for running in ice stretches as far aft as the forward engine room bulkhead.

Accommodations for twelve passengers are provided in spacious outside cabins, each with private bath. They are panelled throughout with Swedish maple, mahogany, American walnut and other fine woods.

A new milestone has been reached by the Johnson Line in the addition of the *Golden Gate* and her sisterships for direct service between Europe and the North Pacific seaboard, a service which began in 1914. The *Golden Gate's* European ports of call include Antwerp, London, Gothenberg, Hamburg, and Stockholm. Visits are also made to Curacao, Barranquilla, the Panama Canal and Pacific Coast ports of Central America.

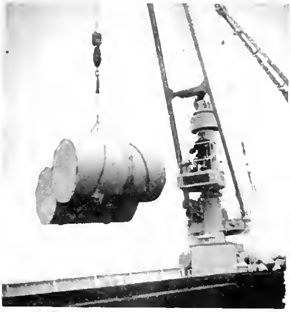
The third vessel of the Johnson Line's series, the *Los Angeles,* will have adjustable pitch propellers operated from the bridge. This device was described at length in an illustrated article in the August 1947 PACIFIC MARINE REVIEW.

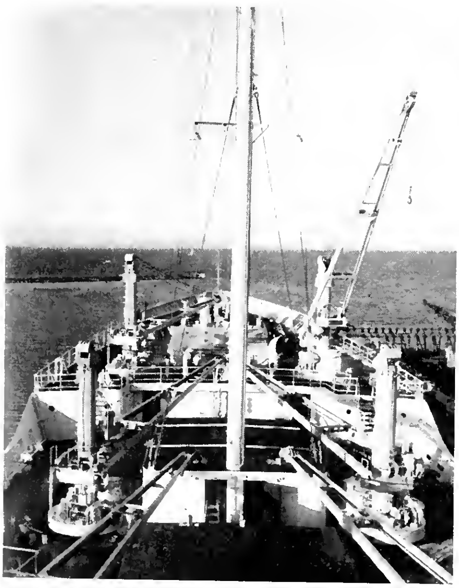
Promenade and Boat Deck Plans of the GOLDEN GATE.



PROMENADE DECK

BOAT DECK



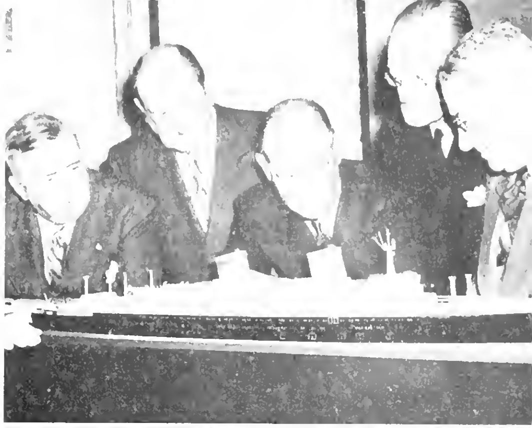


Above and below: The cargo crane in operation.

These cranes take the place of the booms and masts popularly associated with cargo handling and they offer a degree of flexibility and speed so essential to a quick turnaround in port.

These three pictures show the beauty of the furniture and fittings in public rooms and stateroom. The woodwork in all of these rooms would do credit to the finest piano.

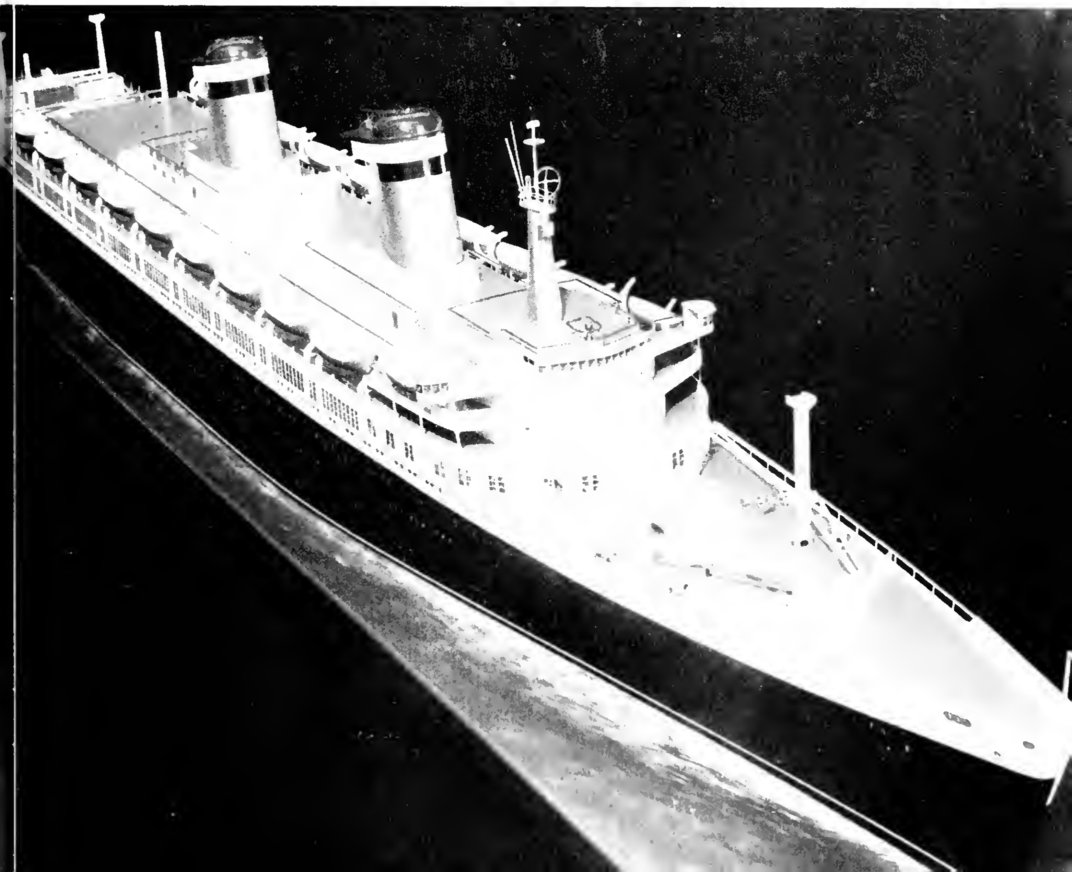
U. S. Lines Plans Big Ship



Model of proposed 65,000,000 dollar luxury liner for United States Lines being scrutinized by officials of the United States Maritime Commission, the United States Lines, and Gibbs and Cox, Naval Architects. This ship would be the largest, fastest, most luxurious liner ever built in this country. The vessel, which will be air conditioned throughout, would have a gross tonnage of approximately 48,000 tons, accommodations for 2,000 passengers, a crew of 1,000, and be able to maintain a cruising speed of 28½ knots. The new ship would have 48,000 cubic feet of cargo refrigeration space as well as 100,000 cubic feet of space for dry cargo and passenger automobiles. In time of a national emergency, the vessel could be quickly converted into a transport to carry 12,000 troops.

Left to right: Joseph K. Carson Jr., Maritime Commission; Vice Admiral William W. Smith, Chairman of Maritime Commission; John M. Franklin, President of the United States Lines; William F. Gibbs, Vice President of Gibbs and Cox, Naval Architects; Raymond S. McKeough, Vice Chairman of the Maritime Commission.

Proposed 65,000,000 dollar express liner for United States Lines North Atlantic service.



Importers and Exporters

this Vital News is for You!

Foreign Trade Zone No. 3
Port of San Francisco

is now in Operation

San Francisco Pier 45—Site of proposed Foreign Trade Zone.

Pacific World Trade

Official Definition

A Foreign Trade Zone is "an isolated, enclosed and policed area" into which "goods may be brought, stored, and subjected to certain specified manipulation operations. If reshipped to foreign points the goods may leave the restricted trade zone without payment of duty . . . Such products cannot, of course, leave the Foreign Trade Zone for domestic use or consumption without full compliance with existing customs laws. Goods may not be manufactured or exhibited in such an area."

Privileges

Although the strictest safeguards are maintained, co-

operation with traders is the keynote of the entire setup. Prospective customers may be taken into the Zone by importers and allowed to examine merchandise unsupervised by a customs storekeeper. (This practice is subject to some exceptions, such as a precious stones and small articles of high value.) Importers are allowed to take away samples by making an informal entry and paying duty at the customs office at the Zone. Retail stores can send buyers into the Zone to purchase merchandise from samples sent from abroad. Salesmen's swatches of fabrics can be cut and forwarded to prospective customers both in the United States and elsewhere.

Schedule of Charges

The Board of State Harbor Commissioners for the Port of San Francisco has a tariff fixing charges for storage and handling. These rate schedules will be comparable with the established charges set for similar services by private enterprise. Vessels docking at Foreign Trade Zone berths will be subject to regular dockage and wharfage charges in accordance with the published tariffs of the Board of State Harbor Commissioners.

Permissible Operations

These are among the things the trader can do in a Foreign Trade Zone: Bring in anything foreign or domestic not prohibited by law, and whether dutiable or free; trans-ship without entry; export or import in original package or otherwise; have goods immediately appraised and duties liquidated, if desired; break open and pack; inspect, sample, recondition or clean; import part of a shipment and export or destroy the balance; re-mark or label; mix domestic with foreign goods; manipulate otherwise.

The trader enjoys freedom from quota restrictions; drawback problems; immediate entry; bonds, (with one exception); also freedom from internal revenue tax; local liquor control; time limits on storage; duties on waste or loss; and freedom from all other customs rules and laws.

Among permissible operations in a Foreign Trade Zone is the manipulation of merchandise. Application for manipulation must be made to the Collector of Customs, who, in doubtful cases, refers the application to the Commissioner of Customs. Applicant has further right to appeal to the Foreign Trade Zones Board. A deputy Collector of Customs is stationed permanently in the zone.

The official address is: Foreign Trade Zone No. 3, Port of San Francisco, California, U. S. A.

Operators Named

West Coast Terminals have been appointed as the operators of the San Francisco Foreign Trade Zone which opened June 10. As operators, West Coast takes care of stevedoring, handling and other terminal operations.

West Coast will be remunerated on a percentage basis. Dockage and wharfage charges will still be paid to the Board of State Harbor Commissioners. Wharf demurrages and storage charges will be divided between the board and the zone operators.

A highly informative moving picture is available for public showing. It indicates the place of the Zone in San Francisco harbor history, and shows how cargo may be consigned directly to the Zone by the foreign shipper, or redirected there by the consignee, either before or after arrival of the vessel.

The Giant Tankers

(Continued from page 60)

pressure of 125 pounds per square inch at the pump. In the main cargo tanks there will be four 14" O.D. fore and aft cargo suction lines and a 6" stripping line which is connected into one of the main cargo lines in #1 tank.

The stripping pumps are arranged to take suction from the vapor space of the main cargo pumps, the main lines, stripper line or sea, and discharge into #10 center tank, the main suction and discharge crossovers in the pumproom and to a 6" discharge line crossover on the upper deck. The four main cargo pumps are arranged to discharge to four crossovers located on the upper deck aft of the amidship house.

A steam actuated reciprocating bilge ballast pump and a like type fuel oil transfer pump, with the customary suction and discharge connections, are to be provided in the forward pumproom.

The cargo piping and cargo tank venting system are arranged to permit the carriage of Grade "A" petroleum products.

The aids to navigation include radio receiver and transmitters, radio direction finder, radar, echo sounding equipment, gyro compass and gyro pilot automatic steering.

Cheer Up

"It is a gloomy moment in history. Not in many years —not in the lifetime of most men who will read this paper—has there been such a grave and deep apprehension. Never has the future seemed so incalculable as at the present time.

"In France the political cauldron seeths and hub-bubs with uncertainty; Russia hangs, as usual, like a dark and silent cloud over the horizon of Europe, while all the resources and energies of the British Empire are sorely tried and are yet to be tried more sorely in keeping with the deadly Indian insurrection and with distressed conditions in China."—*from HARPER'S WEEKLY of October 10, 1857.*

Pacific World Trade

Reg. U. S. Pat. Off.

Shipping a Factory

THE first ship ever to carry a factory across the ocean docked at Pier 26 last month.

This was the 10,500-ton cargo vessel *Delftdyk* of the Holland American Line which arrived in San Francisco May 24. In her hold she carried 1,100 cases (1,350 tons) of parts of the aluminum foil mill "Tscheulin" once geared to the huge war machinery of Hitler's Germany. The Inter-Allied reparations commission had allocated the plant to the United States and high-bidding "Permanente" had acquired it for removal to Los Altos, California.

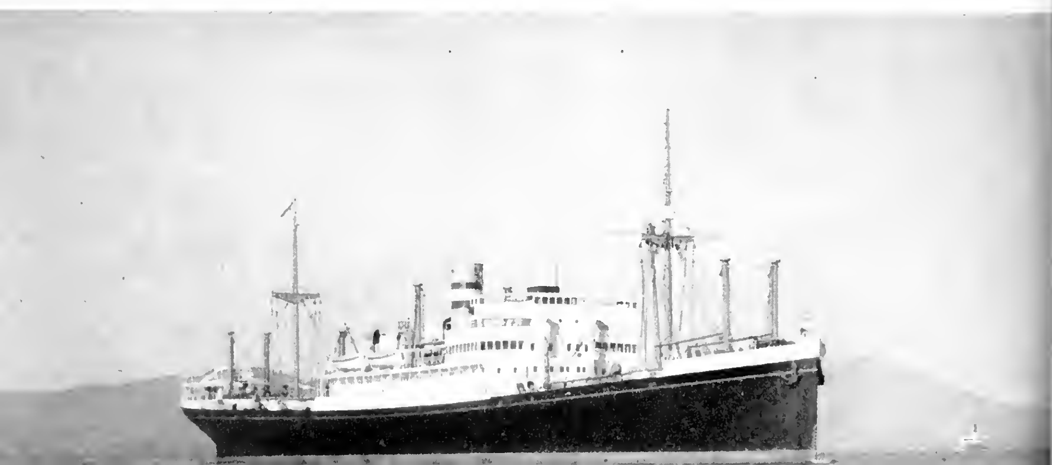
Storage of the cases was the greatest shipping problem. "We sat many a night and day figuring out a loading plan," Capt. Thomas Stuut of the *Delftdyk* admitted. One of the main difficulties was that the cases could not be placed according to their size and weight but had to be loaded in their order of importance. Permanente engineers in Rotterdam indicated the crates required at once for the re-assembly work in the States. Those had to be placed so that they could be unloaded in San Francisco before the rest of the cargo.

The problem of unloading was solved by rigging up the 40-ton boom of the vessel which is never used for ordinary cargo. The really heavy work, however, was accomplished by a Smith Rice derrick, a floating crane with an 80-ton capacity.

"No accident happened and not one case was dropped during the difficult loading and unloading operation," Capt. Stuut said proudly. Permanente officials had nothing but praise for the excellent way in which the unwieldy cargo was handled.

In December 1947 a small news item announced the purchase of the German war plant by Henry J. Kaiser's corporation. Only a little while after this press release Mr. De Lanoy, Pacific Coast Manager of the Holland American Line, sat in the Permanente office, offering the services of his shipping line. After a series of negotiations it was agreed that the Holland American Line

Holland American Line cargo vessel DELFTDYK, shipping German aluminum factory to San Francisco.



Photograph shows aluminum foil mill machinery being unloaded from DELFTDYK, which carried cargo from Rotterdam to San Francisco. The plant was purchased by The Permanente Metals Corporation and will manufacture Kiser Aluminum foil at its new location near San Jose, California. This shipment, totaling 1350 tons, was the first of three necessary to move the plant from Germany to this country.

would be entrusted with the shipping of the entire factory.

The *Duidendyk*, another H.-A. cargo vessel, will soon follow the *Delftdyk* and unload the balance of the German factory at San Francisco's port.

Although the aluminum mill was the most important cargo the twin-screw diesel carried to California, it was not the only one. There were bananas, Dutch herring and cheese, window glass and pepper aboard to make use of the *Delftdyk's* total freight capacity of 12,480 tons.

Capt. Strut is no stranger to San Francisco shipping circles. As skipper of the *Sommelsdyk* this was his main port of call during the war when his vessel carried arms and materials to the various allied fronts.

Brazil's New Trade Controls

Under Brazil's new foreign trade law, foreign trade will be concentrated in economically useful channels and subjected to licensing. The new law was made necessary because of the growing scarcity of dollar exchange, according to the Brazilian Government Trade Bureau. In a recent article in their bulletin the background of the new controls was explained. It was pointed out that most nations lacked vital goods after the war—food, industrial and transportation equipment, particularly—and had no exchange for the purchase of even the most necessary items. In filling preliminary demands of some countries the United States exhausted the dollar exchange of the buying nations, thus contributing to the necessity for U. S. loans and credits and eventually, the Marshall Plan.

Brazil's imports were few during the war but they exported as much as possible to the Allies. However, the credits they built up abroad were not sufficient and the Brazilian government set up partial controls in an attempt to retain enough foreign exchange to continue its most necessary purchases abroad, but the drain continued and was intensified by the decline in exports in relation to imports.

Although the new Brazilian law covers exports, it is primarily aimed at import control. The new controls will parallel a policy of stimulating production, particularly production of scarce goods, and increasing agricultural and industrial output so as to meet domestic needs and export the surplus. Under the new law Brazil will be able to accumulate foreign exchange with which to buy abroad goods most vital to her domestic economy.

SHIPPING UNDER THE MARSHALL PLAN

Editor's Note:

This statement is issued jointly by the Economic Cooperation Administration and the U. S. Department of Commerce, in response to many requests from businessmen as to how they can be sure their products will be considered for shipment to Europe under the European Recovery Program. The requirement in the European Recovery Act for at least 50% of the tonnage to be carried in American flag ships (providing rates are favorable and vessels available) is to be covered by procedure still to be outlined by the Economic Cooperation Administration.

American exporters will continue to do business in the same way as in the past. All arrangements for the soliciting of orders, the requesting of export and import licenses and exchange permits, the shipping and storing of goods, and the payment for individual shipments will be initiated and carried through by the private exporter in the United States and the importer in Europe.

Only certain bulk food products that are in short world supply, such as grains, rice, flour, fats and oils, and a small volume of relief supplies, such as drugs, have largely been bought on an interim basis by the U. S. Government and shipped direct to European governments. These food commodities were bought and shipped by the Commodity Credit Corporation of the Department of Agriculture. Some of the surplus agricultural products acquired by the CCC under its price support program will also be made available for purchase by the ERP governments with ECA funds. The relief supplies were bought and shipped by the Bureau of Federal Supply.

The area in which government procurement applies is subject to continual review with the purpose of restricting as far as possible commodities obtained through government channels.

Exporters who have established business contacts with agents and distributors in Europe should continue to solicit business as they have normally done in the past. The European importer will consult with his government regarding the need for a particular product as part of the recovery program. The European governments will —in consultation with U. S. Government agencies— program the requirements to be paid for with ECA funds. (When the European governments have reached an agreement with the United States as to the requirements which are to be financed by these funds, public announcement of the list of goods will be made.) The European importer will obtain permision from his government to pay for his goods with dollars that are set aside for ERP purchases. A permit system will be set up so that the Economic Cooperation Administration in the United States and the European governments will be enabled to keep account of the funds that are spent. The mechanics of this system are now being worked out. Whatever system of accounting and disbursement is devised, the European importer—not the United States exporter—will initiate the first action in requesting permission to use ECA dollars to pay for a shipment.

When the United States exporter receives an order from an importer in an ERP country, he will apply to the Office of International Trade, Department of Commerce, for an export license—if an export license is needed for the goods ordered. Neither the ECA nor any other agency of the government will guarantee the granting of an export license simply because an importer in the ERP country has received permission from his government to pay for a shipment with dollars. In granting export licenses for shipments to these countries, the OIT will follow its normal procedures.

The ECA is concerned primarily with providing financing to the ERP countries, with determining—in consultation with those countries—how the funds shall be used, and with keeping account of the funds used. It will not decide *which* exporters are to do business with Europe. And it will not decide which brands or makes of a particular product will be paid for with ECA money. These decisions will be made by the European importer who buys the goods he considers the best for his money.

Many people have gathered the impression that the ERP is another Lend-Lease arrangement. They remember that under Lend-Lease the Treasury Procurement Division (now the Bureau of Federal Supply) mailed requests for bids to suppliers in the United States, and that after delivery was made to the U. S. Government, the private businessman had nothing to do with the shipment of the goods. The ERP legislation is based on the belief that the use and strengthening of private channels of trade is an important part of economic recovery, not only for Europe, but for the rest of the world.

Pacific World Trade

THERE'S LOTS OF LIFE IN THE IMPORT BUSINESS

American President Lines reports that their freighter *President Grant* arrived in San Francisco from the Far East on May 11 carrying the following:

- 7 elephants
- 6 bears
- 200 monkeys
- 20 Gibbon apes
- 4 Siamese golden cats
- 2000 birds
- 5 large cases of snakes, each case containing about 20 reptiles, including cobras and boa constrictors.

Port of Long Beach Expansion Program

Upper left: The first sheet steel bulkhead being driven for the extension of Pier B in the Outer Harbor. Pier B will be extended approximately 1500 ft. and is 500 ft. wide. The construction of Pier C will also be commenced in the near future. Pier C will be 2475 ft. long and 600 ft. wide and will be of the same type of construction, i. e., sheet steel bulkhead with solid earth fill. Contracts were let in the amount of $2,261,056.00 with the United Construction Company and $436,914.00 with Franks Dredging Company for the extension and construction of Piers B and C and dredging and filling operations.

Upper right: The new transit shed at Berth 5, Pier A, Long Beach Outer Harbor. The shed is 608 ft. long and 128 ft. wide and was constructed by Peter Kiewit Sons at a cost of $512,000.00. It is now being used by Calmar Lines, a subsidiary of Bethlehem Steel Company. Calmar ships are bringing in 6,000 tons of steel from the East Coast every ten days.

Lower left: The bulkloading conveyor located on Pier D. The conveyor is now being used in the movement of 40,000 tons of rock salt to Japan.

Lower right: An interior view of the shed at Berth 5 which shows the clear span construction of the shed. This is typical of the interior construction of the new transit sheds being constructed by the Port of Long Beach.

The expansion program now being carried on by the Port of Long Beach will entail an expenditure of approximately $85,000,000 over the next twenty years. The Port of Long Beach owns and operates 475 oil wells and is the fourth largest producer of oil wells in the State of California. The revenues from these oil operations are being used in carrying on this development program and have already retired all bonded indebtedness and the interest thereon, making the Port of Long Beach probably the only debt free port in the world.

In a recent address at the National Maritime Day luncheon in Los Angeles, Arthur Eldridge, general manager of the Los Angeles Harbor Department forecast harbor development projects totaling approximately $175,000,000 between Los Angeles and Long Beach Ports and said that when the new projects are completed in the dual port construction program, facilities will not be exceeded by any other port.

SUMMARY OF SITUATION IN JAPAN AND KOREA

Editor's Note: Under date of May 19 the Secretary of the Army, Kenneth C. Royall, released the full report of the "Johnston Committee" which recently visited Japan and Korea at the request of the Army to study the economic position and prospects of those countries. The Committee's suggestions for measures required to improve conditions are contained in the following summary.

Quoted in full is the section of the report dealing with foreign trade and merchant marine, of which we will have more to say from time to time.

The Committee consisted of Percy H. Johnston, chairman of the Chemical Bank and Trust Company; Paul G. Hoffman, now Administrator for the European Recovery Program; Robert F. Loree, Chairman, National Foreign Trade Council, formerly vice-President of the Guaranty Trust Company, and Sidney H. Scheuer, senior partner of Scheuer and Company. The committee was assisted by Herbert Feis, Special Advisor to the Secretary of the Army; Alexander Lipsman, Treasury Department, and on textile matters by Frederic A. Williams, former president of Cannon Mills, Incorporated.

IN JAPAN General MacArthur, Supreme Commander for the Allied Powers, is administering the occupation of the four main islands which have a population of nearly 80,000,000.

The Committee has been greatly impressed with the complete demilitarization of Japan and with the progress made in developing representative government in that formerly feudalistic country. A thoroughly democratic constitution has been adopted and an elected Diet, or Parliament, is actively functioning. Unlike the situation in Germany and Korea, Japan is not cut up in separate zones of occupation, and a Japanese Government is actively dealing with the daily problems of its people. The Japanese people themselves seem to be fully cooperating with the occupation authorities. These are outstanding achievements.

Pacific WORLD TRADE

Although two and one-half years have passed since the surrender, no treaty of peace has yet been signed. The United States has been paying the military costs of occupation and in addition, under its international law obligation as occupying power to prevent disease and unrest, has been furnishing food and other relief supplies to keep the Japanese people alive. These relief costs run to nearly $400,000,000 a year. In our opinion the United States must now face squarely the problem of assisting the Japanese people to become self-supporting.

Japan has been shorn of its empire and no longer has under its control resources of food and raw materials which formerly contributed to its prosperity. It has been expelled from China, Manchuria, Korea and Formosa, southern Sakhalin, the Kurile, Marshall and Mariana groups of islands. It grows only 80 per cent of its minimum food requirements. Its population is increasing a million a year. It must produce and export industrial products in large volume to live. It is short of natural resources and raw materials.

The Committee believes that the United States should now assist the recovery of Japan. Japan's industrial products are needed throughout the Far East, whose countries also need Japan as a market for their potential exportable production—their tin, rubber, copra, wool, cotton, iron ore, bauxite, sugar and rice. Japanese industry is operating at a very low level—less than 45 per cent of the 1930-1934 average. Shortage of needed raw materials is a major reason. However, despite the upheaval of war and defeat and the changing social outlook, the traditional will to work of the Japanese people themselves is still in evidence. Food production and coal production have been rising, although both are still far below minimum needs. Food collections are better than at any time since the occupation—in fact, rice collections reached 100 per cent of this year's quota while the Committee was in Japan.

The reparations issue has not been settled. The Japanese do not yet know which plants and which equipment will be left to them, so, within industries thought to be subject to reparations, incentive to restore and reconstruct is suppressed. Plants which are needed in bringing about the recovery of Japan should be retained and only excess capacity removed. Otherwise the United States, which is now extending relief to Japan, would in reality be paying their reparations bill. In our opinion, the capacity that can be spared without affecting Japan's useful peacetime productivity is not great. It is most important that the present uncertainty be removed and the reparation issue be finally settled.

Japanese exports have been growing and reached $173,000,000 last year. Most of these exports, however,

were made possible only by a special scheme of American assistance—particularly in cotton manufacture. A beginning has been made, nothing more. Total exports will have to increase to eight to nine times present levels to provide payment for the imported food and raw materials needed to sustain a reasonable standard of life in Japan. In our opinion, it should be possible to accomplish this if tranquillity is restored throughout the Far East, if present restrictions on Japanese trade and travel are lessened, and if help is given to import raw materials and get production going. An eventual shift in Japanese food and other imports from the dollar area to the sterling and Far Eastern areas, with compensation in Japanese industrial exports, is essential to any permanent Far Eastern recovery.

The Japanese merchant marine has been reduced by war losses to 20 per cent of its prewar size. Most of the larger ocean-going Japanese ships have been lost with the bulk of the remaining fleet consisting of small coastal and fishing vessels. Payment to non-Japanese shipping of present-day inflated freights on essential imports is a large factor in Japan's foreign trade deficit. We believe that Japan should be encouraged to increase its merchant shipping both by new building and by bare-boat chartering of available vessels.

Principal among Japan's internal problems is the inflationary spiral resulting from the extreme scarcity of raw materials and consumer goods, the constant upward pressure of wages and other costs, and the heavy budgetary deficit. The internal cost of the occupation adds to this problem. Until this inflation problem can be solved by greater production, increased tax revenues, and more rigid control of governmental expenditures, the establishment of a stable foreign exchange rate, and even of a stable internal economy, can hardly be achieved. Here again, the importation of greater amounts of raw materials and the resulting increased production will assist in a solution.

Drastic and continuing efforts by the Japanese themselves are necessary to balance the national budget. Self-help and self-sacrifice in clarifying and controlling internal price and wage relationships, in reducing national expenditures and increasing tax revenues, in expanding domestic production of food, coal and products from other Japanese resources, are essential to proper use of any American assistance and, of course, to economic recovery itself. The Japanese people will have to work hard and long, with comparatively little recompense for many years to come, in order to survive and support their growing population.

In conclusion the Committee agrees with General MacArthur and the Department of the Army that industrial recovery of Japan on a peaceful basis is necessary to bring about a self-supporting economy; that this program has now properly become a primary objective of the occupation; and that the American Government in the national interest should support a reasonable recovery program.

In Korea the problem is complicated by the artificial division of the country into two zones of military occupation. The Koreans are eager for the independence to which our Government is committed. It has been impossible so far to hold elections throughout all Korea, but an election is soon to be held in the South Korean (American) zone, under the auspices of the United Nations. After the election and the establishment of a representative government it is proposed under the United Nations resolution to work out arrangements for the withdrawal of occupation troops.

Korean food production is improving and South Korea should eventually be able to supply its own food requirements if fertilizer requirements can be met. Other problems, however, are most acute. Lack of raw materials is greater even than in Japan. South Korea is dependent on North Korea for most of its electric power supply. The Korean railroads would stop if coal supplied by our occupation authorities in Japan were cut off. The industries which Japan developed during 40 years of Japanese control are operating at only about 20 per cent of capacity. South Korea is short of raw materials, and equally short of management and technical supervision formerly supplied by the Japanese. As in Japan, the United States has been supplying food, fertilizer, and petroleum products to keep the economy from collapse and to prevent widespread disease and unrest.

Here again the Committee believes, with General Hodge, our Military Commander, that reasonable assistance should be given to finance importation of raw materials necessary to increased production of agricultural and industrial goods.

Raw Materials and Foreign Trade (and Merchant Marine)

To achieve economic recovery, Japan must secure a far greater volume of raw materials than at present. It can, by careful planning and effort increase the supply of a limited group of raw materials found within Japan: bituminous coal, copper, lumber and other building materials. But most of the products required by industry are not found within Japan. These are too numerous fully to list: textile fiber and wood-pulp for its cotton and rayon industries; iron ore, manganese and coking coal for her iron and steel industry; bauxite for the aluminum industry; rubber, tin, zinc, lead for the manufacture of vehicles, farm tools and machines; salt and other chemicals for her fertilizer plants; copra for soap-making; oil for the whole of her economy. To secure these Japan must begin to trade again with the rest of the world on a large scale. Hardly less important is Japan's need for certain essential parts and components

(Please turn to page 75)

Bankside Power Station, London.

Foster Wheeler Announces Big British Boiler Order

Foster Wheeler Corporation, New York, announced recently that its subsidiary, Foster Wheeler Limited, has received an order from the British Electricity Authority for the installation of boilers in the London area at a total cost of approximately $6,000,000.

This order, which comprises four boilers for the new Bankside Generating Station to be located on the South Bank of the River Thames in the heart of London, represents one of the most important contracts recently placed in England.

Two 60,000 kw Turbo-generators will be supplied with steam by this group of boilers. Three boilers will be working and one acting as a standby. The boilers are of the Single Drum Type. Each will be capable of producing 375,000 pounds of steam per hour at a pressure of 950 pounds per square inch and a temperature of 925 degrees Fahrenheit at the superheater outlet when supplied with feed water at a temperature of 370 degrees at the economizer inlet. Condenser-type Superheat Control will insure accurate control of the final steam temperature over loads ranging from 280,000 to 375,000 pounds per hour.

Jr. World Trade Ass'n Meeting

May meeting of Junior World Trade Association. Left to right: A. M. Zauala, Export Department, General Mills; K. E. Macfarlane, Standard Oil; J. J. Buckley, American President Lines; Roberto Regala, F. A. O., Consul General of the Republic of the Philippines.

New Ore Carriers Will Import From Venezuela

Named for the Port of Baltimore, the *S.S. Baltore,* last in a series of eight high-speed 25,000 ton ore carriers being completed at Bethlehem Steel Company's Sparrows Point Shipyard, was launched April 16.

W. L. Jacobs, Bethlehem's Vice President in charge of Raw Material Properties, stated that shipment of ore from Bethlehem's iron mines in Venezuela to the company's Sparrows Point steel plant probably would be made beginning with the new ore carriers in 1949.

The Venezuelan mines and shipping facilities are being prepared for production during 1949. They are expected to yield up to 2,000,000 tons of iron ore annually. This will be shipped in the new ore carriers to the United States for use in Bethlehem's Eastern Steel plants, and a substantial amount will go to Sparrows Point.

Six of the new carriers—the *Venore, Chilore, Marore, Feltore, Lebore, and Santore*— are now bringing ore to the Sparrows Plant. Another, the *Cubore,* is nearing completion. They are the largest vessels ever built in the port of Baltimore, and the largest and fastest bulk carriers of their type. They have an overall length of 582 feet, four inches, a beam of 78 feet, and ore-carrying capacity of 402,000 cubic feet.

With a speed of 16 to 18 knots, each of the vessels is designed to carry 300,000 tons of ore annually to Sparrows Point, from Bethlehem's mines in South America. Modern accommodations are provided for a complement of 48 officers and crew. Completely electrified equipment is used in the galley, and refrigerator compartments, and there is a modern hospital amidships.

Because of their large size, unusual provisions were made for the mooring, including large steam mooring winches in addition to the conventional securing fittings.

Goldilocks and the Three Wolves

At the World Trade Week Luncheon of the San Francisco Ad Club, where Port Manager General Wylie was the speaker, Miss Joyce Tissot, "Miss Maritime Day," seems to be edging away from Leland Cutler, president of World Trade Center Authority; Dick Prosser, Harbor's advertising expert, and Bob Wylie. Actually "Miss Maritime Day" is not edging away but is charming her friends away from Ad Club president Chapman who is trying to put over some idea of his own in another direction.

JAPAN AND KOREA

(Continued from Page 73)

for its industrial plants, which Japan will have to import until its own industries are repaired and reestablished.

The relatively meager revival of Japanese foreign trade has until now been largely dependent upon raw materials and supplies made available by the United States. Failure to press vigorously for restoration of foreign trade would prolong the expensive necessity of underwriting Japanese deficits.

SCAP* has estimated that under favorable conditions and with reasonable aid from the United States, a balance between exports and imports should be attainable by 1953.

It has been estimated that Japan will require about \$1,575,000,000 of exports each year (at current prices) to pay for essential imports of food and raw materials (and necessary invisible imports) to maintain a tolerable food ration and standard of living at home. A balance of payments could, of course, be maintained with lower exports and imports, but at the cost of a lowered and perhaps unbearable standard of living in Japan. An increase of at least eight to nine times 1947 exports is necessary to meet the goal set. Under favorable circumstances of world and Japanese trade the Committee considers that this goal may be attainable, although the realization of these estimates is obviously subject to many uncertainties both in Japanese and in world-wide economic and political conditions.

During 1947, imports into Japan were \$526,130,000 and exports were \$173,568,000. Approximately 25% of the imports were financed by foreign exchange created by the sale of Japanese exports, the balance being the value of relief supplies procured with United States appropriated funds. It will be seen, therefore, that the most strenuous efforts will have to be employed to reach the 1953 targets. The Committee makes the following comments and suggestions which, if successfully carried out, should assist materially toward this end. It recognizes fully that the occupation authorities have been striving to overcome many of the obstacles involved.

First, Japan's merchant fleet should be substantially enlarged. Out of 5.75 million gross tons of steel vessels over 1,000 gross tons before the war, there are now afloat in the hands of the Japanese 1.15 million gross tons of serviceable or repairable vessels. Since a large number of these vessels are necessarily engaged in domestic coastwise services, the reduction in vessels available for overseas foreign trade has been greater than the overall 80% loss indicated by this tonnage comparison. Even if given every opportunity to increase merchant shipping, by building, purchasing and bareboat chartering, it will be many years before Japan's merchant tonnage can be reasonably adequate for its needs.

Prevailing costs of transporting goods to Japan are extremely high. For instance, salt, which sells at \$3.00 f.o.b. Mediterranean port, costs \$14.00 additional to land in Japan. Iron ore, at \$7.00 f.o.b. Hainan, costs \$9.25 additional to land in Japan. Coking coal, at \$12.00 f.o.b. Canada, involves a freight charge of \$14.00 to \$16.00 to deliver in Japan. The Japanese have always been effective ship operators and builders. Their shipbuilding and ship operating costs have been low as compared with other countries. They have the know-how and the manpower. To the extent that they are able to employ domestic shipping and shipbuilding facilities, they will be enabled to reduce their substantial need for foreign exchange now required for shipping services.

Japan has valuable facilities for the construction of ships of all sizes. Present restrictions on building vessels of six thousand gross tons and more should be lifted to permit building for their own use and on contract for foreign buyers. There are indications that such orders would be available to them.

The argument has been made that Japan's shipping should be limited because of its war potential. However, Japan's army, navy and air force have been abolished so there should be little fear of future Japanese aggression from the mere existence of a merchant fleet. Also, it has been historically the American position, and generally recognized by maritime nations, that world trade and the long-range interests of all nations are best served when the high seas are open to all. Purely competitive considerations do not, in our opinion, justify a prohibition that would prevent the Japanese from developing the necessary merchant shipping to assist in balancing their foreign trade.

Second, the Committee recognizes that by reason of the economic upheaval stemming from war, Japan will, of necessity, be forced to seek export business throughout the world. Besides textiles, it is capable of producing modern machinery and metal products of diversified character. Chemicals, rubber products, pottery, toys and handicraft all are potential exports. Where its products are fairly competitive and it uses fair methods of marketing, they should be admitted to the world's markets.

It is important to the Japanese (and to the American taxpayer) that we use our influence to overcome the understandable trade discriminations which are practiced against Japan, especially in markets in which they have heretofore enjoyed large trade. In the judgment of the Committee the countries involved are impairing their own well-being by refusing to trade with Japan and are retarding the reactivation of a potentially valuable economic asset for the benefit of all Asiatic countries. We, in the United States, have been called upon to overcome deep and justifiable resentment in our attitude toward Japan. Neighboring nations have much to gain by the adoption of a new and more receptive attitude. The reciprocal advantages ensuing are unmistakable.

Third, our financial assistance to both China and Japan can be most productively employed if active trade between them is resumed. However, China is not at present trading any important volume of goods with Japan. Many raw materials can be sold by China to good advantage in Japan; in turn, Japan has many commodities and facilities which China needs. United States trade

(Please turn to next page)

*Supreme Commander for the Allied Powers, General MacArthur. SCAP is also used, as indicated by the context, to refer to his staff.

JAPAN AND KOREA

(Continued from preceding page)

policy is emphatically in accord with this philosophy. The European Recovery Plan is based upon it.

Fourth, it would be advantageous if Japan could obtain the foods it imports from nearby sources as in the past, rather than from the more expensive dollar areas as at present. Perhaps this cannot be arranged immediately, but, as these neighboring countries move toward more normal production, restoration of these trade patterns should be possible. This will be helpful to both the Far Eastern and American economies.

Fifth, the Committee recognizes that, in a scarcity economy requiring equitable allocations of available raw materials and other products, government must continue to play an important supervisory role over trade. However, the restrictions and red tape now required by the Japanese authorities are undoubtedly hampering trade. Although the Committee has been informed that both the Japanese Government and the occupation authorities are taking steps to simplify and streamline the methods of handling business transactions, it urges that this be done quickly and thoroughly. Direct business contracts between buyers and sellers should be encouraged. Liquidation of the Foreign Trade Kodans (government buying and selling monopolies) as soon as the acute need for raw material allocations ends, and limitation of the operators of Boeki Cho (government foreign trade agency) to the minimum, seem to be well advised.

It is also desirable to establish direct contact between Japanese businessmen and their potential customers by permitting the movement of Japanese nationals to foreign markets.

Sixth, all export possibilities must be stimulated. As has been already stated Japan historically has always been a processing nation which purchased raw materials abroad, manufactured them in Japan and sold a major portion of the finished products abroad to pay for its necessary imports of raw materials and food. This economic pattern has been even more true of Japan than of Great Britain or Western Germany, and must be revived on a large scale for Japan to live.

Prior to the war textile products constituted 60% of Japan's exports. The remaining 40% comprised mainly machinery, metal products, chemicals, rubber products, pottery, toys and handicraft articles.

The cotton textile industry represents a vital force in the creation of a healthier Japanese economy. There is a present demand for its products, but great difficulties have been experienced recently in making foreign sales in dollars because of the world-wide dollar scarcity. Under existing circumstances, attention should be given to three-way transactions, such as shipment of cotton from the United States to Japan, manufactured textiles from Japan to the Netherlands East Indies and tin from there to the United States in an amount sufficient to repay the cost of the raw cotton. Normally, the cotton industry is highly competitive; to operate successfully, Japan must be in a position to adjust its marketing practices to this reality.

The Commodity Credit Corporation contract for the manufacture and sale of cotton yarn and goods produced from raw cotton supplied by it has not yet been liquidated. All possibilities of sale must be vigorously pursued. The large potential United States market should not be excluded from this effort. The possible volume of Japanese cotton textiles that might be offered for sale in the United States would be only an insignificant percentage of United States production and constitutes no threat to American producers as long as present fair merchandising methods are pursued.

It is obvious that unless a sufficient portion of the textiles manufactured from American cotton to repay the cost of the raw cotton is sold for dollars or for some commodity or currency which can be converted into dollars, Japan will be unable to buy American cotton. Historically the Japanese used a large percentage of American cotton and it is of great interest to American cotton growers that this problem be solved realistically so that the large potential Japanese market not be lost.

We endorse the cotton credit now pending in the Congress; it should include only sufficient limitations requiring direct or indirect dollar sales of goods to assure repayment of the credit. Japan should be permitted to accept sterling for that portion of fabric and yarn sales not needed for dollar repayment, purchasing therewith necessary imports from sterling areas. Japan's textile manufacturers are at present unable to employ the hedging facilities of the cotton futures markets, and this disadvantage should be overcome as soon as possible.

The expanded use of the woolen and worsted facilities of Japan can produce substantial benefits and should be encouraged.

The rayon industry has been dependent in large measure upon domestic pulp supply. Arrangements have been recently completed for a substantial tonnage of Swedish pulp, with which it is hoped to improve the quality and quantity of rayon production. Inasmuch as Japan has no facilities to supply rayon yarn in cone form, it is lim-

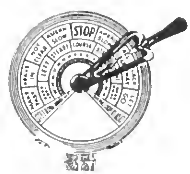
(Please turn to page 81)

Lurline Receives Merchant Marine Pennant

Matson Navigation Company's luxury liner SS LURLINE receives a Merchant Marine Naval Reserve pennant on Maritime Day in San Francisco, Saturday, May 22, 1948. Present on the ship's flying bridge for the ceremony (left to right) are: Hugh Gallagher, vice-president of Matson Navigation Co.; Commodore Frank Johnson, captain of the LURLINE; Fleet Admiral Chester W. Nimitz, USN; Miss Joyce Tissot, "Miss Maritime Day"; John E. Cushing, president of Matson Navigation Company; and Rear Admiral Donald B. Beary, USN., Commandant of the Twelfth Naval District.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

LOWER TRANSITS FOR HIGHER LATITUDES

MANY NAVIGATORS HAVE BEEN FRIGHTENED by the term "lower transit" and as a result have never taken the trouble to spend a short while in making a study of it to determine how simple the problem really is. Determining the latitude by an observation of a body when it transits the lower branch of an observer's meridian is really less difficult than when at upper transit.

All navigators are surely familiar with the oft quoted phrases, "your latitude is equal to the altitude of the elevated pole," or "your latitude is equal to the declination of your zenith." In making a study of observations of bodies at lower transit these phrases take on more meaning and by making a couple of sketches we can quite easily see how these quotations are facts. Before making the sketches, let us review a few facts and definitions.

1. Our zenith is a point on the celestial sphere directly over our head, and is contained in the upper branch of our celestial meridian.

2. Our Nadir is a point 180 degrees from our zenith and is contained in the lower branch of our celestial meridian.

3. The elevated pole is the celestial pole we are nearest to. North latitude—North Celestial Pole, South latitude—South Celestial Pole.

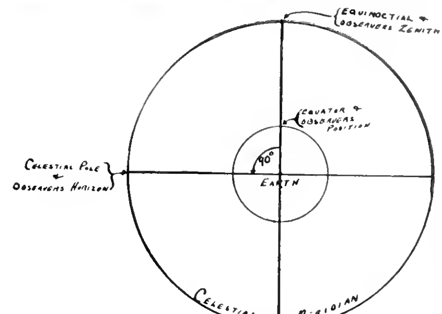
4. The lower branch of our celestial meridian is that branch from Pole to Pole which contains our Nadir.

5. The Equinoctial is a great circle of the Celestial sphere which is formed by the plane of the Earth's Equator extended.

6. The angular distance from the Equinoctial to the Celestial poles is 90 degrees.

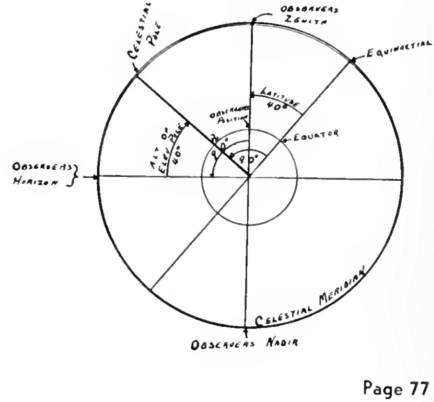
7. The angular distance from the observer's zenith to his celestial horizon is 90 degrees.

By these we can see that if the observer were on the Equator, his zenith would be in the Equinoctial and the Celestial poles would be in the plane of his horizon as is



Sketch 1.

Sketch 2.

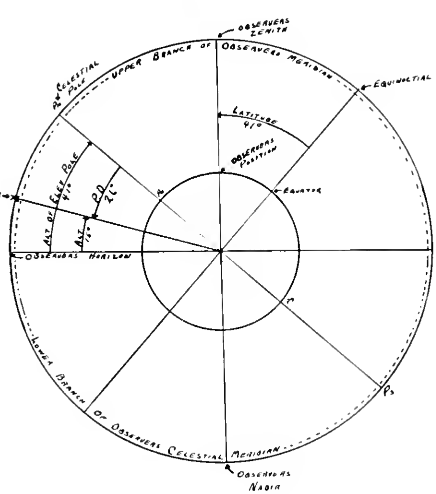


shown in Sketch 1.

In Sketch 2 we see that, though the observer's position on the earth is changed, the angular distance between his zenith and horizon is still 90 degrees and the angle between the Equinoctial and Celestial pole is still 90 degrees. These two angles being equal, surely then the angle between the Equinoctial and the Observer's Zenith will be equal to the angle between the observer's celestial horizon and the celestial pole, thus proving the foregoing quotation that the "latitude is equal to the altitude of the elevated pole."

Now if we just had a high powered neon sign marking the position of the celestial pole on the celestial sphere it would be quite simple for us to measure the altitude of this point and determine our latitude. Since we do not have this sign, however, we can determine its position by measuring the altitude of celestial bodies as they transit the lower branch of our celestial meridian. We all know that polar distance is the angular distance from the elevated pole to the body. We can determine this polar distance by subtracting the declination from 90 degrees. It might be well to note at this time that observations of bodies at lower transit can only be made of bodies whose declination is of the same name as the latitude. If we determine the polar distance and then measure the altitude of a body as it transits the lower branch of our meridian, we can add the two together and find the altitude of the elevated pole and the latitude, as shown in Sketch 3. To measure the altitude of a body when it transits the lower branch of our meridian, we must keep in mind this fact. The altitude of a body decreases until it transits and then increases; or when it transits the lower branch, it is at the lowest altitude it will subtend from that particular latitude. It is just the opposite of the meridian altitude at upper transit. Therefore, if we do not wish to take the sight by time, which is really impractical, we would make observations when the body subtended the lowest altitude. Then apply the corrections for refraction, Dip, and semi-Diameter and parallax if necessary. Add this true altitude to the polar distance to determine the latitude.

SKETCH 3



Some other facts to remember are that if the sum of the co-latitude and the polar distance is greater than 90 degrees you will not be able to see the body as it transits the lower branch. Since refraction causes a varying amount of error at low altitudes, it is advisable to refrain from using observations when the altitude is less than 10 degrees. It is best if we make sure the co-latitude and polar distance does not exceed 80 degrees. From this we see that the lower our latitude, the higher the declination must be.

With these facts in mind we can see that except when navigating in extremely high latitudes our observations will be limited to stars. Other celestial bodies will have too great a polar distance.

Now for determining the approximate time the stars will be transiting the lower branch of our meridian. The simplest method is by using the Rude Star Identifier. After setting up the star identifier for the desired time of observation (as was outlined in a previous issue), we look for the stars which are about to cross the 0—180 degree line of the template on the opposite side of the pole from the observer. While doing this, keep in mind that these stars will apparently be moving from West to East. An alternate method is by applying 180 degrees to your D. R. longitude to the West and then finding the stars whose G.H.A. is near that number of degrees. To do this you must subtract the change in G.H.A. for the G.C.T. of observation (found on Pages 214, 215 and 216 of the Nautical Almanac) from the D. R. longitude plus or minus 180 degrees and then look at the G.H.A. for 0 hours on that particular date. Example: On July 15, 1948 an observer in D. R. Lat. 48° 40′ North, Long. 142° 30′ West desires to see what stars will be available for a lower transit observation. By consulting his Nautical Almanac, he sees that sunrise will occur at approximately 0412 L.C.T. and beginning of morning twilight will be approximately 0120, so he decides to use a L.C.T. of 0330 to determine if any stars of proper declination will be near the lower branch of his meridian at that time. He computes in the following manner.

Desired L.C.T. of observation	03^h 30^m	
Longitude in time	9^h 30^m	
Desired G.C.T. of observation	13^h 00^m	
Longitude	142° 30′	West
Plus	180° 00′	
G. H. A. of Lower Branch	322° 30′	
Correction to G.H.A. for 13^h G.C.T. (Page 215 N. A.)	195° 32′	

Required G.H.A. of Star at 0^h G.C.T. 126° 58′

Looking in the Nautical Almanac opposite July 15, he finds that at 0^h G.C.T. the Star Dubhe (which is the only one near his lower branch with the required declination) has a G.H.A. of 127° 37′0 or would be 39′ of arc past the lower branch of his meridian at 03^h 30^m L.C.T. By converting this arc to time by using the correction table on Page 214 of the N.A., he sees that Dubhe will transit

(Please turn to page 82)

Admiralty Decisions

By HAROLD S. DOBBS *of San Francisco Bar*

Curiosity Killed the Cat

The expression "Curiosity killed the cat" has probably been used to describe situations of one type or another, but I doubt that it has ever been used in connection with an admiralty case.

The 9th United States Circuit Court of Appeals, which is our own circuit, recently had before it the case of *Bornhurst vs. United States of America*, in which the curiosity of the libelant (the seaman) caused him to suffer personal injury, for which he was denied recovery. Libelant was a seaman aboard the *Puente Hills* employed in the capacity of a wiper in the engine room department. The *SS Puente Hills* was owned and operated by the United States. While the ship was at sea, the libelant was injured when a heavy tank top fell and struck his hands. The trial court resolved the case in favor of the respondent, United States of America, and against the libelant, following which libelant appealed to the United States Circuit Court of Appeals.

In his libel he alleged he was working in the course of his employment at the time he was injured; that the respondent failed to provide him with a seaworthy ship at the beginning of the voyage on which the accident occurred, and failed to take reasonable means to insure the seaworthiness of the ship for the duration of the voyage; that the unseaworthiness was due to improper construction of the operating gears used to raise and lower the tank tops of the storage tanks; and that after the voyage was under way, respondent failed to use reasonable means to insure the seaworthiness of the ship in omitting to take means to prevent the tank tops from falling down and in particular, the tank top to No. 8 port wing tank which struck the libelant. Naturally, other allegations sought to charge the respondent with direct and proximate cause resulting in libelant's injuries. The answer of respondent denied all of the charges and the court found that libelant's allegations were untrue.

As the facts were developed, it became apparent that what actually happened was simply that the libelant, prior to the time he sustained injury, had been cleaning the quarters of certain members of the engine room department, but before completing the work, had actually left the part of the vessel where he was required to be in the performance of his job, and made his way over and across a portion of the after well deck of the vessel to a point where other seamen were engaged in doing work with respect to a six hundred pound movable and moving tank top cover. Libelant voluntarily, and not in the performance of any work or duty which he was required to do or perform, placed his hands on the edge of the tank and leaned forward, supporting his weight by his hands for the purpose of examining the inside of the tank. In other words, libelant's curiosity had caused him to leave his regular job and wander over to another part of the ship for the purpose of satisfying his own curiosity as to the work that was going on and the condition or appearance of the inside of the tank, which of course was none of his business.

The court found that the acts of the libelant in doing what I have just described, were caused solely and exclusively by the libelant's curiosity, and so, "Curiosity killed the cat".

Stevedore Employer Held Solely Liable

The problem of determining the moment at which the vessel owner loses control of the vessel from the standpoint of liability to third parties, and the moment that the repair man, as he is better known, assumes the liabilities attendant in and about the ship, has always, of course, been determined as a matter of fact rather than law.

An interesting decision determining the factual problem was decided by the United States District Court for the Eastern District of New York in December of this last year. The case is entitled *Frusteri vs. United States of America and Arthur Tickle Engineering Works, Inc.*

In the Frusteri case, libelant, a stevedore employed by the Tickle Engineering Works, was injured as the result of being hit on the head by a "chunk" of ice which fell from a nearby mast of an army transport vessel owned by the United States, on the deck of which vessel libelant was then working at a winch. Libelant sued the United States, alleging injuries sustained as the result of negligence. The United States, in turn, impleaded the Tickle Engineering Works, alleging that if there was any negligence causing the injury to libelant, it was solely the negligence of the Engineering Works.

Libelant's employer (Tickle Engineering Works) had duly obtained insurance against such accidents in accordance with the Longshoremen and Harbor Workers Compansation Act. Libelant had already made a claim for compensation and as a matter of fact, he had received certain payments and benefits up until the time he had filed an election to sue the United States.

Libelant argued that both the United States and the Engineering Works were jointly negligent. The court, however, failed to agree with libelant's contention and held the Government free of negligence and the Engineering Works guilty of sole negligence.

Briefly stated, the facts are that this Government-owned vessel was a former French passenger ship which the War Shipping Administration had converted into a troop transport. It was brought into the port of New York as a dead ship, and subsequently turned over to the Tickle Engineering Works for conversion from a troop transport to a hospital ship. The work involved a complete rearrangement of the interior of the vessel,

removing all troop accommodations and the rearrangement of operating quarters, crew quarters, substituting quarters for medical staff, nurses, etc., removal of armament, complete painting of the ship and illumination of her. In other words, the work described above amounted to a major rebuilding of the vessel.

During this period of conversion, there were days upon which Tickle Engineering Works had over twelve hundred men employed in and about the vessel. The French crew who brought the vessel into the port had already departed and the Tickle Engineering Works were then in complete charge and possession of the vessel. The evidence did disclose that the United States had three or four men taking inventory of equipment in the storerooms, etc., and possibly watching the progress of the work. But the work that I have just described was confined to duties that did not cast upon them care over the condition of the deck and such matters as were solely the duty of the Tickle Engineering Works. This was not a case of a ship being temporarily laid up for repairs, or where the ship, for one reason or another, was considered dangerous in which to work, such as where there was presence of gas or other similar danger. On the contrary, the accident occurred as follows: On or about the 14th of February there had been occasional snow and cold weather. As the weather moderated some of the ice on the mast dropped down on the deck and was allowed to lie there until it melted. According to Strenskri, a fellow workman of libelant, "we kept telling him (our foreman) that ice was falling down * * * it kept on thawing and it kept on coming down * * it did not look good." Apparently nothing was done about the matter and they kept on working. In a comparatively short time, about 11 a.m., a somewhat large piece of ice fell and hit the head of libelant.

In other words, due to this thaw, the gradual falling of pieces of ice took place, all within a period of a couple of hours. The court refused to find that this condition was such or existed for such a length of time as to indicate serious danger so as to make apparent to the owner of the ship that the particular place where libelant was working was unsafe, with ample opportunity to correct such a situation, assuming that some control and possession still remained in the United States. Nevertheless, there was a duty upon the Tickle Engineering Works to temporarily offer protection to the libelant who was standing at the winch, or even to suspend work until the ice had either fallen or been removed from the mast. Evidence was adduced by expert testimony to show that the tarpaulin or canvas could have been used as a sort of protective net in a situation such as this, and therefore the court was of the opinion that the negligence was that of the foreman of Tickle Engineering Works in refusing to heed the warnings and requests of the workmen at the winch.

Inasmuch as the court refused to find that the United States had any further control over the vessel at the time of the accident, and further that the Tickle Engineering Works, as a result of the failure to act on the part of its foreman was guilty of negligence, the court dismissed the United States and made the further finding that Tickle had duly provided compensation under the Longshoremen and Harbor Workers Compensation Act to libelant, and therefore the remedy for libelant under the Longshoremen and Harbor Workers Act was exclusive, which necessarily left the libelant with no recovery in the District Court, but merely a right to return to the Federal Security Agency for the pursuit of his further rights under the Longshoremen and Harbor Workers Compensation Act.

Suspension of Bar of Statute of Limitations

The Circuit Court of Appeals for the Second Circuit was recently confronted with a very interesting decision arising out of the war between the United States and Japan. Libelant-appellant was a man by the name of Alexander Osbourne and he brought suit against the United States of America and American President Lines, Ltd. who are respectively named respondents-appellees. The case was heard by the distinguished Justices Learned Hand and Augustus Hand, in addition to Frank, who prepared the opinion.

Appellant sought to recover for injuries suffered through the negligence of appellees while employed as a crew member of their vessel, the *SS President Harrison.* He was employed from October 15, 1941, to December 8, 1941. He was interned along with the rest of the crew by the enemy on the last mentioned date. He did not return to the United States until October, 1945. The instant suit was commenced on July 31, 1946. The United States and American President Lines excepted to the libel on the grounds that it had not been filed within the two year period of limitations permitted under the Suits in Admiralty Act or the three year period under the Jones Act.

The lower court held "with reluctance" that the action had been barred because "failure to start action within the time prescribed extinguishes the right of action". It added, however, that libelant had prosecuted his claim with due diligence after his return to this country. The case was filed in the Circuit Court of Appeals for the Second Circuit following the court's order dismissing the libel.

The question of whether the limitation period under the Suits in Admiralty Act or under the Jones Act should apply, is of no real concern, for if the appellant's action is barred, it is barred under either statute. The question is moot.

Generally, where a statute creates a cause of action which was unknown at common law, a period of limitation set up in the same statute is regarded as a matter of substance, limiting the right as well as the remedy. Filing a complaint within the prescribed period is a condition precedent to recovery, and the cause of action is extinguished after the running of the period. The general rule, developed chiefly with respect to the Federal Employees Liability Act, has been applied also to the period of limitations in the Jones Act, which incorporates the period in the Employers Liability Act, and to the Suits in Admiralty Act. The practical results of

the application of this rule have been that the period of limitation under any of the three statutes will control the time for bringing suit in a state court regardless of state statutes of limitations; that the period of limitation under any of these Acts will not be extended, as it would be in the case of an ordinary statute of limitations, by a claimant's disability to sue because of infancy or insanity or by a delay occasioned by the fraud of the defendant; and that the defendant cannot waive the defense of the period of limitations.

Appellant did not deny the force of these holdings. But he maintained that they were not applicable to his case because of the extraordinary circumstances that throughout the period when he ought to have brought suit, the courts were unavailable to him as a prisoner in the hands of the enemy. The leading case on which he relied is *Hanger vs. Abbott*, 73 U.S. 532. There a resident of New Hampshire brought suit against a resident of Arkansas in the federal courts in Arkansas shortly after the civil war. The debt sued upon had been contracted before the war; the defendant pleaded the statute of limitations. The Supreme Court held that during the war both plaintiff's right and remedies had been suspended, as the courts had not then been open to the parties. The Court recognized that the statute of limitations contained no express exception regarding war periods, but stated that exceptions had been made which were not in the statute.

The Hanger case has been consistently followed in the federal courts. Its doctrine has been applied not only where the plaintiff was a citizen of the United States, but also where he was an enemy alien during a war. It has also been applied where the statute of limitations was of the substantive type involved here, not the ordinary type as in the Hanger case, because the considerations for so tolling the ordinary statute apply also to the special type. State courts, facing the same problem in cases involving limitations provisions in wrongful death statutes, have held that the statute should toll for enemy aliens, despite silence on the subject in the statute itself.

The court concluded that there was no reason why the Hanger doctrine should not control. The cases cited show there would be no doubt that a Japanese citizen employed as appellant was on the *SS President Harrison* would have been able to sue for similar injuries. Therefore, as the court said, "It would seem the height of unreasonableness to grant such redress to one of our former enemies at the same time we denied it to a citizen who, through no fault of his own, was held prisoner by that enemy." The court continued by saying, "Neither do we think that distinction should be made because of the type of statute of limitations involved. All statutes of limitation are based on the assumption that one with a good cause of action will not delay bringing it for an unreasonable period of time; but, when a plaintiff has been denied access to the courts, the basis of the assumption has been destroyed. Whatever the reasons for describing this type of statute of limitations as substance rather than procedural—and we suspect the chief reason was to make the period of limitation named in the statute, rather than that of the forum, control in cases brought in state courts—we think we do the distinction no violence by holding that either type of statute will toll for one who is a prisoner in the hands of the enemy in time of war."

The case was reversed and remanded to the District Court.

JAPAN AND KOREA

(Continued from page 76)

ited to skein packaging. This fact, plus the fact of the comparatively inferior quality of the Japanese product, puts it at a disadvantage in world markets, more especially in countries equipped with high-speed processing facilities. While the export of rayon yarn is desirable, too much early hope should not be built up in this direction. The relatively low price of rayon staple fiber throughout the world and the fact that the Japanese product is not favored because of its poor quality do not encourage the belief that they can quickly develop large export demand. Therefore, in the judgment of the Committee, rayon yarn and staple fiber production should be planned with primary emphasis on spinning and weaving these rayon products in Japan. A large percentage of this fabric production should be readily salable in this form to foreign buyers.

Raw silk and silk products were one of Japan's chief prewar trade assets. Export sales of raw silk for 1935-39 ranged between 400,000 and 500,000 bales annually and those of silk fabrics ranged between 75 and 125 million yards annually. From the surrender to the end of December 1947 (over two years) only 44,210 bales and 12.5 million yards were sold. Since January 1, 1948, with more realistic pricing and sales policies, 20,000 bales and approximately 5.2 million yards were moved.

Before the war, and increasingly during the war and since, silk has lost favor. Growing nylon and rayon competition has been largely responsible for this decline.

The Japanese are using all their ingenuity to overcome some of the technical difficulties which the use of silk involves in competition with other fibers. It is likely that the situation is now at its worst and that gradual improvement both in raw silk and silk fabric sales will be experienced.

In addition to gradually increasing textile exports, it is planned to expand largely export sales of machinery and metal products, ceramics, minerals, chemicals, drugs, handicraft, toys, processed fish, and paper and wood products.

Fundamental to any successful export program is control of inflation, and the supply of the necessary imported raw materials to get the program under way.

We find a difficult circle of circumstances in the Japanese productive economy. Insufficient necessary raw materials result in insufficient production; insufficient production results in insufficient exports; insufficient exports result in insufficient foreign exchange to pay for the necessary raw materials. Until this circle is broken Japan's economy will remain prostrate and dependent upon a food dole such as the United States is presently supplying. The best way to break the circle is by supplying sufficient dollar exchange to enable Japan to purchase the initial foreign raw materials.

Marine Insurance

The London Letter

By Our United Kingdom Correspondent

A Liverpool Company Report

Major A. Harold Bibby, chairman of the Sea Insurance Company, Ltd., Liverpool—the Sea Company, established in 1875 and now possessing a paid-up capital of £500,000, with reserve funds greatly exceeding that amount, has the distinction of being the only large marine company which has not so far been absorbed by one of the fire companies—has reviewed the present situation of marine underwriting. He reports that the company's marine premium income in 1947, at £1,454,389, shows a big increase over 1946 of £324,095. But, he goes on, this account, which will not be closed until the end of 1948, so far shows a less favorable underwriting experience than recent years. It is anticipated, nevertheless, that it will show a satisfactory profit.

A large proportion of the Company's business, and particularly of the increased business shown in the year under review, comes from foreign sources, principally what are today known as the "hard currency" areas.

The York Antwerp Rules

There is a growing volume of opinion that the question of the amendment of the York/Antwerp Rules, 1924, should be handed over to the Comité Maritime International. Some valuable particulars of the suitability of the C.M.I. for the work have just become available.

The rapid industrial expansion in the last 150 years created a divergence in the system of commercial law, partly due to political pressure and partly to the divergence between the English system of commercial law and that derived from Roman law, which is largely followed in nearly all Continental jurisdiction. This diveragence became increasingly manifest among the principal trading and maritime countries, and more recently even between the English and American Courts, which, although theoretically following the same system, were affected by the political outlook.

It was in order to rectify and check this unfortunate development that the late Maitre Louis Franck, a famous Belgian advocate and statesman, conceived the idea of forming an international body whose object would be to achieve and maintain the unification of commercial law amongst the principal maritime countries of the world. This idea resulted in the formation of the Comité Maritime International, which had its first meeting in Brussels in 1897, at which there were present delegates from nine nations. Its first consideration was the law of collision at sea and salvage, on which there were divergent views.

The Maritime Convention Act of 1911 was the result under which the rule of division of loss as now applied in the Admiralty Court was established. Since then it has met in various capitals at frequent intervals, the most recent being last September in Antwerp. Its most successful achievement was the unification of the law of the Carriage of Goods by Sea, which is now embodied in the legislation of most countries, but in this case credit must be given to the International Law Association, which was responsible for the draft of the Brussels Convention of 1922.

In honor of its founder, the seat of the Comité is at Antwerp, and the president is traditionally a Belgian. Its constituents, however, are the national associations established in all the principal maritime countries, who send delegates to each session. The character of the Comité is predominantly commercial, the legal members being purely advisory. Final results are decided by the representatives of commercial and maritime interests, such as underwriters, shipowners and bankers. It is to commercial rather than to legal implications that the work of the Comité is directed, and for that reason it is judged to be the most suitable body to discuss matters like the York/Antwerp Rules.

Lower Transits For Higher Latitudes

(Continued from page 78)

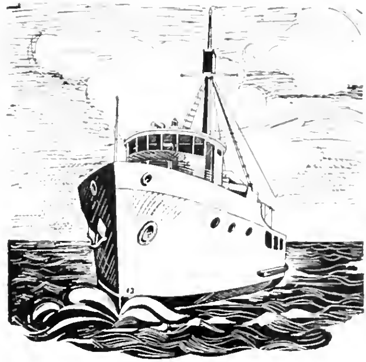
this lower Branch 2^m 36^s sooner than 03^h 30^m or at 03^h 27^m 24^s L.C.T. This navigator a few minutes prior to the time of lower transit goes out on the bridge where he has a 45 ft. height of eye and proceeds to make his observation waiting until the star subtends its lowest altitude. When the star begins to rise above the horizon again in his sextant, he knows that the star has transited his meridian. He then notes the sextant altitude of the star to be 20° 50.′3. Looking up the correction for a 45 ft. H. E. in Table C of the N.A., he finds it to be minus 6′.6. Picking out the correction for refraction from Table A for an altitude of approximately 21°, he finds it to be minus 2.5. Adding these two corrections and applying them to the sextant altitude as follows:

Sextant altitude	20° 50. ′3
Correction	9. 1
True altitude	20° 41. ′2

Subtracting the declination of Dubhe (62° 02. ′1 N.) from 90° he gets the polar distance of Dubhe as follows:

	90° 00. ′0
Declination	62° 02. ′1
Polar Distance	27° 57. ′9
True Altitude	20° 41. ′2
Altitude of Elevated pole	48° 39. ′1
or latitude	48° 39. ′1 N

An ex meridian or reduction to the meridian may be solved at lower transit just as at upper transit. However, care must be used in picking out the variation per minute and the reduction is always subtractive instead of additive as at upper transit.



Dredge and Attendant Plant for Bureau of Reclamation

THE PACIFIC COAST ENGINEERING COMPANY of Alameda, California, is at present engaged in the construction of the 20" Hydraulic Cutter type Suction Dredge, "Colorado", for the U. S. Bureau of Reclamation. The dredge is of sectional construction, designed to be knocked down into easily handled shipping units. The "Colorado" is to be fabricated at the Company's plant in Alameda, California, where it will be assembled and put into operation in the Colorado River. The river between Hoover Dam and Parker Dam has been silting heavily, and the level of the river bed has been rising over the past few years until there is imminent danger of flooding the town of Needles and the main line tracks of the Santa Fe Railroad. The dredge is to be operated in

Pacific Coast Engineering Company plant.

Profile and Deck Plan for Reclamation Bureau's Dredge on Colorado River

Dredge and Attendant Plant

the Colorado River to dredge a channel which will lower the river bed level sufficiently to eliminate this hazard. The Company is furnishing, in addition to the dredge, a work barge with pile driver and A-Frame, a pipe barge, a fuel barge for carrying diesel oil from the shore base to the dredge and a 40′ twin screw, diesel engine.

The dredge is composed of nine hull pontoons with an over-all length of 130′, a width of 30′, a depth of 7′4″ and an operating draft of 4′10″. The sectional hull is designed in such a way that the pontoons overlap with a minimum of 16′ between longitudinal joints. The pontoons are bolted together using 1¼″ bolts and water tight grommets. Each hull section is designed as a water-tight unit. The deck house is constructed with portable side panels and 10′ wide portable roof sections, which are complete shipping units. Cranes and hoists are provided over the pump in order to handle the pump from its seating in the hull overboard to the work barge. An overhead trolley runs the length of the house from the stern to the 7-drum hoist to service the main engine and auxiliary engines. A bridge type crane is provided to service the 7-drum hoist and the cutter drive. The entire hull, deckhouse, and pilot house are of all-welded steel construction.

The superstructure frames are welded steel construction. The spud frame, the forward frame and the ladder frame are pin connected, and the center A-frame over the pump well amidships is a fixed unit welded to the hull structure.

The dredge is designed for digging alluvial silt and fine sand and gravel from a depth of 25′ below water level and to discharge 500 cubic yards of solid material per hour through a 2,000′ pipe line at an elevation 10′ above water level. The entire unit is so constructed that it may be readily dismantled for shipment by rail to another work site. No shipping unit will weigh over forty tons.

The dredging pump is designed with a 24″ suction, 20″ discharge solid steel case direct connected to an Enterprise model DSQ316, 16″ x 20″, 6 cylinder 1350 HP, supercharged diesel engine operating at 360 RPM. The connection between the pump shaft and the engine is made with a Thomas Flexible Coupling and the dredge impeller shaft runs in a Kingsbury GF 21 thrust bearing and Kingsbury L19 self-aligning journal bearing. Power for the cutter motor, hoist motor, service water pumps and other connected loads is provided by an Enterprise model DSX316, 10½ x 12, 6 cylinder, 525 H.P., supercharged diesel directly connected to a General Electric 300 KW 230 Volt DC 3-wire Generator. The two engines are equipped with Elliot Buchii exhaust gas turbo chargers. Jacket water cooling and lubricating oil cooling is by means of heat exchangers, using river water as the cooling agent.

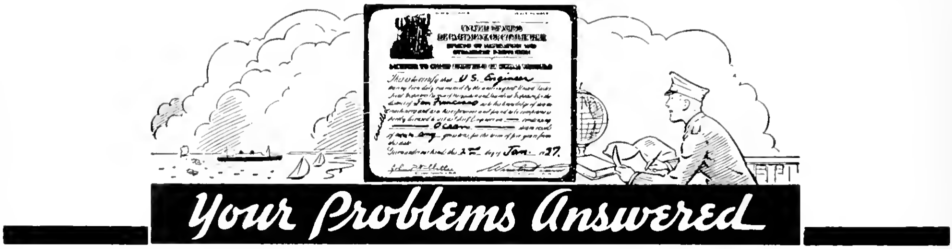
The cutter drive is powered by a General Electric 250 HP, 230 Volt, stabilized shunt wound motor. Control for the cutter motor furnished by the General Electric Company provides constant horsepower between the basic full load speed and 150% of basic full load speed. A General Electric master switch is mounted in the pilot house. This motor is directly conected with a Waldron Flexible Coupling to a Pacific Western Special 9.145/1 herringbone gear reducer. The output shaft of the Pacific Western Reducer is connected to a pinion and bull gear, the latter being directly mounted on the cutter shaft on the deck. The cutter shafting is carried forward through a universal type knuckle joint with a telescopic unit between the hull and the ladder. Thrust from the cutter is taken on a special plate type thrust bearing mounted on the ladder structure. The ladder is all-welded steel consrtuction with the ladder head casting welded directly to the forward end of the ladder structure. Two cutters are provided, one for the standard cutting service, the other specially designed for cutting tules and marsh grasses. The cutters are cast steel, designed so the cutting edges can be renewed.

The seven-drum hoist is mounted on the deck aft of the cutter drive motor. The center drum is for the ladder hoist, the two adjacent drums are for the swing ropes, the two outside drums are for the spuds. Directly ahead of the spud drums are two drums for operating the swing anchors. The hoist is the outside band, friction type and has been designed and will be built by the Pacific Coast Engineering Company. The hoist is designed for air control from the pilot house by means of Westinghouse Air Brake control valves and cylinders. Spud ropes are carried aft under the deck.

The seven-drum hoist is powered by a 60 H. P., 230 Volt, Westinghouse direct current motor with a Westinghouse controller providing for a forty foot per minute rope speed at basic motor speed, a 90 foot per minute rope speed by field weakening and a 15 foot per minute speed by armature resistance. The motor is connected to the main pinion shaft by means of a Pacific Western Gear Speed Reducer. Brakes and clutches are arranged to provide for clutch release and brake setting in case of an air failure.

Auxiliary equipment includes two American Marsh 200 GPM, 100 PSI 4″ type HCM, bronze fitted double suction pumps, each powered with 50 H.P. 1750 RPM, D. C. General Electric motors. These pumps provide for service water to the dredge pump, cooling water which is sprayed on the roof, fire service, etc. Fuel oil transfer from the hull tanks is provided by a Blackmer No. 200 gear pump powered by Westinghouse 3 H.P., 230 Volt, D. C. motor. Lubricating oil is cleaned in a Sharples En Bloc oil Purifier, Model 13 VPHA. Each water-tight compartment is fitted with a 90 GPM Schutte & Koerting Water Jet Eductor. Pump priming is done by a Schutte & Koerting multi-jet Exhauster. Two Fairbanks-Morse Company No. 250 N-30 pressure systems provide potable water service and replenish the fresh water to the engine surge tanks. Fuel oil transfer from the port and starboard fuel tanks in the hull is done by two 1¼″ Fairbanks-Morse bronze fitted gear pumps directly connected to a Fairbank-Morse ¾ H.P. Marine Type DC motor. A number eight Fairbanks-Morse mixed flow propeller pump with above ground discharge delivering 1800 GPM at 12′ head, directly connected to a 7½ HP, 1150 RPM motor is mounted in the pump well for emergency service in event of a break in the hull pipe or the pump case. Starting air and service air for the 7-drum hoist is provided by two ABA Fairbanks-Morse two-stage vertical, tandem water-cooled air compressors, delivering 23.9 cubic feet at 250 PSI. These are belt driven by 7½

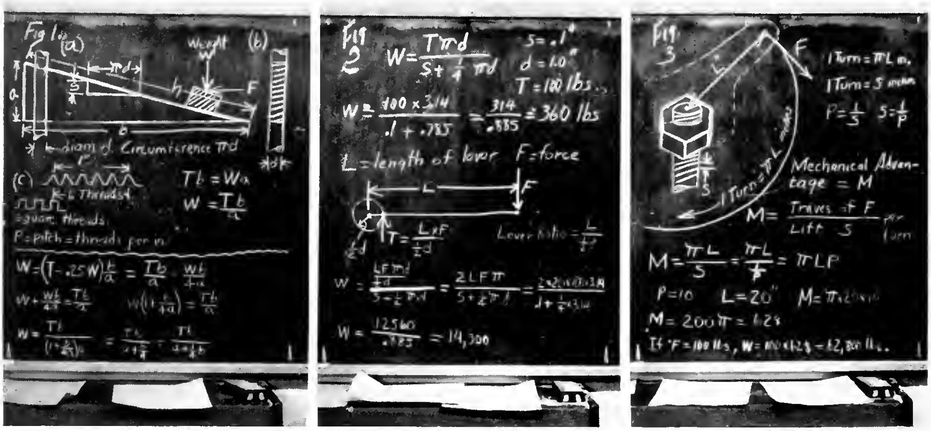
(Please turn to page 93)



by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

"CHALK TALKS" ON APPLIED MATHEMATICS



Blackboard figures 1 to 3 mentioned in the text.

The Screw and its Application

THE MECHANICAL DEVICE CALLED THE Screw is used so extensively throughout the engine room, and in fact all over the ship, that little attention is given to the fine points of application and design. It, too, like other engineering applications is subject to the mathematical approach. Knowing how to deal numerically and quantitatively with a bolt may save a stripped thread or an open joint some time.

The terrific forces which may be set up with a bolt or screw call for some precautions in their use. The length of the handle of wrenches is very carefully selected so that one man pulling up to about his maximum strength will load the bolt up to its maximum or safe value. When great loads are applied to the bolt from steam pressure or other kinds of loads, or where two men pull on the wrench, or where one man puts a piece of pipe on the handle thus giving him added advantage (increased moment) the metal in the bolt may be loaded to the ultimate and fail at a very embarrassing time. Fortunately designers have forseen this possibility and ar-

ranged to have the load shared by many bolts and the failure of one may only give a leak.

But first we must learn to calculate the ratio of the load on the bolt to the force on the wrench. To do this we must consider the nature of the screw thread. The screw belongs to the wedge family and may be considered as a circular wedge. In Fig 1 (a) we show a wedge but have imagined it to be very thin, as for instance a triangular shaped piece of paper. A rod is shown lying against the paper and we can visualize the paper wrapped around the rod. Then the sloping edge would appear as shown in sketch (b) of Fig. 1, a spiral or continuous winding edge. This edge is in reality that of the triangle and we may study the latter and apply it to the spiral.

In the triangle we may consider the length of the hypotenuse h as equal to the length of the base b because the angle will be very small as in the actual screw. In the blackboard sketch the angle is greatly exaggerated. The mechanical advantage of the wedge is the ratio of the length height, or b/a. By moving it a distance, b, we raise the weight a height a. Then neglecting friction, the foot pounds of work done in pushing the wedge must be shown in output in raising the weight in equal foot pounds. In the figure T is the force pushing the weight or wedge and W is the weight. Expressing the equality of work done as Tb equals Wa and from this, by the now familiar method of formula transposition, we arrive at the expression that W equals Tb/a. This is shown in the sketch. Thus the weight lifted can be as many times the force to lift it as the base is times the height of the triangle of the wedge.

In previous articles we have discussed the coefficient of friction. For iron and steel surfaces together and with a minimum or no lubrication this coefficient will be about .1. The coefficient for the steel wheels of a locomotive on the track is about .3 which means that the pull can be 30 per cent of the weight on the wheel. Here there is no lubrication and a rough sanded surface. With the threads of a bolt we may expect at least a smooth surface and a very little lubrication even if in the form of dust and grease. Therefore, a force of 10 per cent of the weight will be needed to overcome friction.

However, with the wedge and the screw additional frictional factors enter. A friction force of 10% of the weight will take care of screw friction if the threads are square as shown at the left in Fig. 1 (c). If, as is usual, the threads are tapered as shown in the same sketch they will be much stronger and resist being torn off the cylinder but will at the same time add greatly to the friction. The force between the screw threads and their companion threads in the nut will be greater than the weight W and, the more the angle of the side of the thread slopes away from that of the square thread, the more will be the force. This is due to a radial component of the weight force tending to expand the nut. This angle is usually 30 degrees giving a 60 degree thread. This may increase the friction force from the 10% to 15%. And also there will be the friction force between the nut and the weight or the plate or washer against which the nut tightens. This adds another 10%, making a total of about 25%.

The formula can now be changed to include friction as an estimate because of the lack of exact knowledge of lubrication and surface condition. It now will be W equals (T minus .25 W) b/a. As shown in the Figure, this reduces to W equals Tb/a plus .25b.

If the diameter of the rod is d, the circumference is πd and as shown we have a little triangle similar to the wedge with πd instead of b and s the height reached in one turn around the cylinder instead of a. T is now the force applied at the surface of the rod or cylinder. Then W equals Tπd/s+.25d. Substituting numbers, suppose s equals .1 inch, d is 1 inch and T is 100 pounds and as shown in Fig. 2 we have a lift of 360 pounds. This means that a hundred pound pull on a rope around the rod would lift about 360 pounds, an advantage of only 3.6 to 1. Without friction and using the same figures we would lift 3140 pounds, an advantage of 31 to 1. Friction is very effective in reducing the advantage of the screw, but it also acts to lock the screw in place and without it the screw would unwind again.

But we have another source of mechanical advantage to add to the screw, that of the lever. See Fig. 2. Instead of applying the force at the surface of the screw we may apply it at the end of a lever and greatly multiply the effect. Suppost we apply the force at the end of a 20 inch lever. The point of application is 20 inches from the center of the rod, or screw. We were applying it at a distance of ½ inch from the center as the rod is 1 inch in diameter. We now multiply the effect by the ratio of 20 to ½ or 40 to 1. The 100 pounds now will lift 4 times 360 pounds or, 14,400 pounds. This certainly is all the load we would want to put on a 1 inch diameter steel rod, as its area of .7854 square inches would be loaded to over 18,500 pounds per square inch.

As shown in Fig 1 (c) the s or spacing between threads of the screw is not used to express the caliber or rating. The screw is usually given as P or pitch threads per inch. The screw in our problem would be 10 pitch. Note that the pitch is 1/s and that s is 1/P. It is also interesting to note that because of the effect of friction, the mechanical advantage of the lever or wrench is a much larger part of the whole advantage than the screw.

There is another approach to an approximate screw load as shown in Fig. 3. It consists of dividing the travel of the point F of the wrench handle by the lift of the nut, both for one turn or any number of turns. This shows a ratio of 628 for the 20 inch wrench handle and the 10 pitch screw. This gives a lift of 62,800 pounds for 100 pounds on the handle, which is more than we could get in actual practice because of the friction. This method of calculation does permit of a proper treatment of the friction.

Note that M the mechanical advantage is proportional to the pitch and the length of the lever. Also that a quarter inch screw would have a pitch of 20. It could be very easily broken with a long wrench. Thus Engineers are careful of the length of wrench they use with screws and bolts.

Our next article will discuss the Coast Guard's Rules and Regulations regarding bolts and their metals and proportions.

- - With The

Bob Streiff

Port Engineer of the Month

SAN FRANCISCO

Bob Streiff

Of Pacific Tankers, Inc.

Born in Winona, Minnesota in 1888, Bob showed an interest in ships at a very early age. His first job was as an Apprentice Machinist and he served with the Navy for three years as a Second Class Machinist, Firsr Class Machinist and Chief Machinist.

As a Machinist Bob went out of Seattle on the old *Minnesota* which belonged to the Great Northern Railroad, and served also as a Junior Engineer. Then he sailed on Army Transports including the *Thomas*, for two years and during 1916 and 1917 on Alaska Steamship Company ships out of Seattle. From 1917 to 1921 he was with the Pacific Steamship Company as Second and First Assistant Engineer. For three years Bob went on tankers of the Standard Oil Company of New Jersey, including the *Gargoyle* and the *Vacuum*.

Luckenbach Steamship Company was his nexr move and finally he decided to run his own machine shop in 1931 and set it up in Oakland where he remained until 1940.

Back to sea—this time for Coastwise—in 1941, Bob remained with them until October 1947 when he became Assistant Port Engineer for Pacific Tankers in San Francisco. He is a popular and respected member of the Society of Port Engineers, and is at present a member of its Board of Governors.

San Francisco Society May Meeting

Top, left to right: B. N. DeRochie, Jr., Pacific Marine Review; Jack Butler, Bob Streiff, Joe Gisler.
Center, left to right: Bill Sizemore, George Harlan, Maurice Antoine, Harry Allen, John Kemple.
Bottom, left to right: Col. W. W. Moore, President Phil Thearle, Louis Ets-Hokin, Charles Haste, Grant Kelly, W. R. Chamberlin.

Future Meetings for San Francisco

The Port Engineers Society of San Francisco has listed the following schedule for future meetings:

JUNE—*Combustion Control* by Mr. Rumble and Mr. Harris of the Bailey Meter Company.

JULY—*Marine Refrigeration* by John Kooistra.

AUGUST—*Application of Bottom Paint.* This will be given by an official of the International Paint Company.

SEPTEMBER—*Marine Steam and Electric Drives* by Engineers of the General Electric Company, George Barr and Hughes Ogilvie.

Port Engineers -

Los Angeles Society May Meeting

At the May 5th meeting of the Los Angeles Society of Port Engineers, held in the Lafayette Hotel, two representatives of the Gulf Engineering Company, New Orleans, demonstrated, by means of a glass boiler, a new device called a turbolizer which is designed to eliminate tube blistering. The principal speaker was S. V. Massimini and the demonstrater, R. W. Kendrick.

Below: Top, left to right: R. W. Kendrick, Gulf Engineering Co., Inc., sponsor of May meeting of the Los Angeles Society; S. V. Massimini, Pres., Gulf Engineering Co., Inc., sponsor of the evening; Joe Hare, U. S. Maritime Commission; Ed Whittemore, Atlas Paint and Varnish Co.
Center, left to right: M. H. Kelly, Richfield Oil Co.; Joe Costello, J. M. Costello Co.; Paul V. Gaudin, Amer. Pacific S. S. Co.; Joe Wosser, Matson Navig. Co.; Burt Hale, Marine Solvents Corp.; R. W. Kendrick; S. V. Massimini.
Bottom, left to right: Cy Cyrus, Union Oil; Lloyd Kennedy, U. S. Coast Guard; Ray Jones, General Petroleum; George Curran, Amer. Pacific S. S. Co.; Roy Campbell, Federal Paint; Glen Gulvin, Amer. Pacific S. S. Co.; M. H. Kelly; Harry Summers, American Bureau of Shipping (retired); George Bradford, P. Banning Young; Joe Costello.

Port Engineer of the Month

LOS ANGELES

George H. Hoxie

Of American President Lines

Drawn to the sea while still a youth, George Hoxie joined up with the Dollar Line back in 1923 for a three year period. His first ship was the *President Jefferson* which he went on out of Seattle—as a wiper.

Then with Pacific Steamship Company—serving, among other things, as water tender, oiler, electrician, storekeeper and plumber.

After getting his license in 1932, George sailed in various licensed capacities for the Admiral Line. He went on the *Admiral Nulton* under Captain Nystrom, who was later captured by the Japanese at Hong Kong during World War II while he was aboard the *Admiral Y. S. Williams.*

After Pearl Harbor George joined the American President Lines as Third Assistant Engineer on the *President Taylor* and served on several ships for them during the war as First Assistant and Chief.

He was then placed in charge of stores and inventories at Western Pipe and Steel for American President Lines, and in January of '46 moved into the San Francisco offices of APL as Assistant Port Engineer. His present job—as Port Engineer for APL at Los Angeles—began in February of this year.

George is married and has one daughter. His hobby? Ships!

George H. Hoxie

On the Ways

New Construction — Reconditioning — Repairs

Tydol Flying A T-1 Tanker Readied by Todd

(See picture below)

The T-1 tanker *Tydol Flying A,* purchased April 23rd from the USMC by the Tide Water Associated Oil Company, was readied for commercial service by Todd's Hoboken shipyard and delivered May 20 to the new owner.

The 309-foot motor vessel was built in 1945 by the Todd-Houston Shipbuilding Co., as the *Tarogle,* and was later changed to the *Tinsley,* which name it held at the time of transfer.

The 3,925-d.w. ton *Tydol Flying A,* brings to fifteen the number of tankers in Tide Water's Eastern fleet, of which seven are recently purchased T-2's.

The work on the *Tydol Flying A* consisted chiefly of removing all of the gate valves, piping rods, and other necessary fittings from twelve oil cargo tanks and installing new equipment. In addition, a Mackay Radio Raytheon Pathfinder radar unit was installed and a spare tailshaft, supplied by the owner, was put aboard. The steel deck in way of the 'midship house section containing the officers' quarters was insulated throughout, and a number of minor repairs were made.

She is considered to be the outstanding vessed in the company's small boat fleet, and will operate out of Bayonne on various assignments to coastal ports, carrying gasoline and heating oil.

Restoration of Railway Dry Docks At Ostende, Belgium

In 1931, railway dry docks of 500 and 1000 tons capacity were installed in the fishing basin of the Port of Ostende, Belgium. These were in continuous and intensive operation from that time into the beginning of World War II, dry docking about 550 vessels per year. After occupation of Belgium by the Germans, they were kept in partial operation under frequent Allied bombing, which eventually damaged the submerged tracks severely. Just prior to the evacuation, the hauling machines were blown up by the enemy, the cradles running down to the lower end of the tracks. This was the condition found when they were inspected after the Armistice in 1945.

Because of the urgent need of dry docking facilities for the fishing fleet and other craft, it was most important that these railway dry docks be restored and put in operation and Crandall Dry Dock Engineers, Inc., Cambridge, Mass., were engaged by the Belgian Government to supervise the work. This involved the installation of new hauling machines (blown up by the Germans), repairing the tracks (damaged by Allied bombing), and repairing the cradle (damaged by both). This restoration has been completed and the railway dry docks in operation for nearly a year.

These railway dry docks have the following general dimensions:

	500 ton	1000 ton
Length over keel blocks	40 m.	50 m.
Length over all	42 m.	52.5 m.
Width over transverse beams	11.5 m.	13.5 m.
Width clear	9.5 m.	11.5 m.
Depth of water over keel blocks, forward	2.90 m.	3.23 m.
Depth of water over keel blocks, aft	4.50 m.	6.03 m.

The tracks are constructed on a uniform gradient of 1:12.4 of sufficient length to provide the depths of water indicated. The portions of the track above water are of reinforced concrete on concrete piles and the submerged sections are of wood on wood piling. The cradles are of structural steel with the deck of wood. They are hauled by cast steel hauling chains, one for the 500 ton and two for the 1000 ton unit, operated by electric hauling machines.

The project was under the jurisdiction of Monsieur J. de Ries, engineer of the Office Central d'Eléctricité et Eléctromécanique of the Belgian Ministry of Public Works, Monsieur G. Willems, Director. The work was executed under the responsible charge of Vernon I. Hight, of Crandall Dry Dock Engineers, who superintended the original installation in 1931.

Tydol Flying A

Railway dry docks at Ostende, Belgium, in their restored condition.

Running Lights

Congressman
Alvin F.
Weichel

●

(See Page 92)

Alvin Weichel Livewire Chairman of Marine Committee

"Al is a hustler" was the description in 1926 of Representative Alvin F. Weichel of Sandusky, Ohio, who, as present chairman of the important Merchant Marine and Fisheries Committee of the House, is proving the accuracy of those early words. The words were those of the late Edward L. Ways, editor of the Sandusky Register, who predicted "real accomplishments from Al."

Representative Weichel took over his present post a year ago, the first Ohioan since 1908 to preside over a major House group.

In his boyhood Weichel worked on Great Lakes steamers between Cleveland, Toledo and Detroit. He comes from early northern Ohio settlers whose descendants now live in every county in the 13th District which Weichel represents.

Weichel is a graduate of the University of Michigan and the Michigan College of Law, and began his law practice in Ohio in 1924. He was elected Erie county prosecutor three times.

Weichel has been a member of Congress since January 1943. His Weichel Bill (see editorial in May PACIFIC MARINE REVIEW) is of the utmost importance to the shipping industry and he is to be commended for his vital interest in the industry.

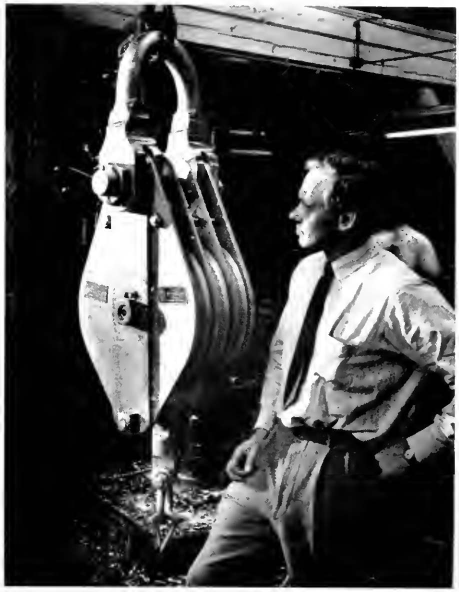
Plant Asbestos Company

With its Marine Department in charge of the widely known and popular Sam J. Gillis, the name of Asbestos Company of California is now Plant Asbestos Company, Inc., with headquarters at 941 Sixteenth Street in San Francisco. The firm operated under the original name for 25 years.

Plant Asbestos Company is exclusive distributor for Plant magnesia products; manufacturer and distributor of Plant packings; distributor for Raybestos-Manhattan and Babcock & Wilcox insulating firebrick.

Associated with Sam Gillis in the Marine Division are C. J. Coleman and J. W. Williams.

The Last Word in Blocks



Above is an 18 inch Triple Extra Heavy Oval Pattern Wire Rope Block, one of four just completed for Ed Bergeron's rigging gang at Bethlehem's San Francisco yard. Manufactured by the Alvin R. Campbell Company, it features Timken roller bearings in cast steel sheaves with center pin pressure lubrication, reverse shackle, and ball bearing swivel becket, all galvanized. The block was designed to the order of the Haviside Company by William Schwartz, and takes a 30 ton load.

Sam J. Gillis

C. J. Coleman

J. W. Williams

Dredge and Attendant Plant

(Continued from page 85)

HP Marine Type, Fairbanks-Morse motors. The main distribution switchboard is located in the deckhouse near the diesel generator sets. The switchboard is designed to carry the main distribution circuits from the 40 KW set and the 300KW set and to the load centers. The switchboard is being designed and constructed by the Ets-Hokin and Galvan Company, who have the sub-contract for installation of electrical equipment and wiring.

The dredge is being furnished with approximately 3,000′ of shore pipe and 1,000′ of pontoon floating line in 40′ lengths. Each length of pontoon pipe is being furnished with the Pacific Coast Engineering Company's patented "Paceco Flexible Pipe Joints." Hand winches for handling the floating line anchors have been designed and are being built by the Company.

The company with its combined facilities for shipbuilding, heavy plate fabrication and general machinery design and construction will do all the work connected with building the hull and house, will build the 7-drum hoist, the main dredging pump, all of the hull suction and discharge piping, the pontoon line and the shoreline.

Shop fabrication is scheduled for completion in August of 1948, at which time the field erection plant will be set up in Needles. The Company expects to complete the contract and make the operating trials in December of 1948. In addition to the dredge, a 40′ tow boat has been designed by the Company for shallow draft operation in the narrow channels of the Colorado River. The boat, a twin-screw, tunnel-stern ship designed and built in Alameda, will be shipped on a flat car complete to Needles, a railroad town on the Colorado River where California and Arizona come together. It is powered by two Sterling MRAB6 90 HP diesel engine, each swinging a 29″x15″ three-blade propeller furnished by the Pitchometer Propeller Company. The hull is designed with a modified scow bow and is equipped with towing knees and A-Frame. A 5-ton B. B. Bros hand hoist is mounted on deck to handle small loads. The fuel barge which has been designed by the Company, is 42′ x24′x5′ molded, and has a capacity of 15,000 gallons of diesel fuel with a 3½′ draft. The pipe barge is a flush deck barge 36x22x4′ molded and the work barge is a duplicate, except that it is equipped with an A-Frame and a double drum American Hoist and Derrick Company, Model 42G gasoline hoist. The A-Frame is furnished with a set of hanging pile driver leads and a pile hammer. The work barge, the pipe barge and the fuel barge are of sectional construction of the same general type as used in the dredge hull.

In addition to the work on the dredge "Colorado" for the Bureau of Reclamation, the Pacific Coast Engineering Company has recently processed a contract with the Central Nebraska Public Power & Irrigation District for a 24′ diameter by 32′ high ring gate for the outlet tower at Kingsley Dam, Nebraska. This unit, with a weight of 100 tons, was built and shipped in 110 days after the signing of the contract. The gate, with a 1¼″ shell, was designed for field assembly and will be erected in eight sections. The Company has under construction two 300 cubic yard dump scows for the Board of State Harbor Commissioners, a 14,000 bbl. gasoline barge for the River Lines and has just recently completed a 14,000 bbl. barge for the Crowley Launch & Towboat Company. Several of these barges of Pacific Coast Engineering Company design are in operation in the San Francisco Bay by the J. C. Freese Company and the Crowley Launch and Towboat Company. The Company has built eight 12,000 to 14,000 bbl. barges within the past four years. In addition to the marine work, the Company completed shipment in March of 1948, a 96″ siphon pipe for the Bureau of Reclamation for installation at Willow Creek in Idaho. Work is in process for many of the oil refineries for pipe and refinery equipment.

The officers of the Company are C. H. Ramsden, President; Will C. Hall, Vice President; S. A. Mueller, Secretary-Treasurer; and C. D. Ramsden, Chief Engineer. Jean M. Allen, of Los Angeles, is Consulting Engineer on the Bureau of Reclamation dredge.

Holding on to the Rope

At port side is B. B. Walker, Pacific Coast Manager for Whitlock Cordage Company; to starboard is Eric Pedley, President of Pedley-Knowles Company. Photo taken in the Pedley-Knowles headquarters in San Francisco.

World Trade Week

Active participants in the activities of World Trade Week, May 16 to May 22, were members of the Women's Organization for the American Merchant Marine, Port of San Francisco. Information booths for the Foreign Trade Exhibit and Seamen's Art Exhibit were staffed by their members at the Ferry Building in San Francisco.

A luncheon and fashion show dedicated to Maritime Day was held at the Fairmont Hotel on May 18 honoring Women's Organization members and guests, an Propeller Club members and wives. Open for inspectio from May 20 to 22 was the California State Maritim Academy Training Ship *Golden Bear*, and on May 2 the annual National Maritime Day Luncheon was hel at the Commercial Club with Governor Earl Warre as guest speaker. Mrs. Earl Warren and Mrs. Cheste Nimitz were guests. Events on May 22 included a

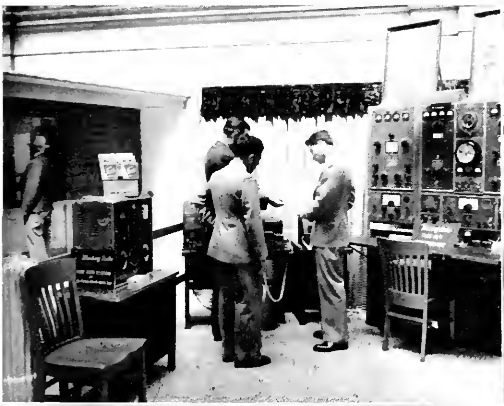
Below—Top: Exhibits at the Ferry Building, San Francisco, on National Maritime Day. At the left is the Mackay Radio & Telegraph Co. booth and at the right, the C. J. Hendry booth.

Lower left: Start of the International Whaleboat Race on San Francisco Bay. Lower right: The race! The winner? Pacific Far East Line. Among those entering this year were Matson, Sudden & Christensen, American President Lines, Army Transport, Alameda Maritime School and Pacific Far East Line. Considered by many to be the best feature of San Francisco's Maritime Day observance, the resumption of the whaleboat race as an annual feature is now assured.

Floats at San Francisco Maritime Day Parade.

Left, top to bottom:
- American President Lines, winner of first prize.
- San Francisco Port of Embarkation, winner of second prize
- Pacific Far East Line, Inc.
- Matson Navigation Company.

Right, top to bottom:
- San Francisco Propeller Club.
- Mare Island Naval Shipyard.
- San Francisco Port of Embarkation's Train.
- San Francisco World Trade Association.
- U. S. Navy.




AMERICAN PRESIDENT LINES
TRANS-PACIFIC AND
THE WORLD SERVICE


THE ROUTE OF
THE BEAR


WORLD TRADE ASSOCIATION


THRIFTY

International Lifeboat Race, Open House at Fort Mason and an Electronics Exhibit, and the all-important parade which began at Civic Center and proceeded down Market Street to the reviewing stand at the Ferry Building.

Judges for the Seamen's Art Exhibit were Miss Alma Carlisle, chairman, member of the Women's Organization for the American Merchant Marine; Douglas MacAgy, director of the California School of Fine Arts; Mrs. Beatrice Judd Ryan, director of Art in Action, City of Paris; William Gaw, director, art department of Mills College; Spencer Macky, director of the California College of Arts and Crafts, and Nicholas Johnson, photographer. Patrons and Patronesses were: Rear Admiral and Mrs. D. B. Beary, USN, Admiral and Mrs. Chester Nimitz, Admiral and Mrs. Jesse Oldendorf, Rear Admiral W. K. Scammel, USCG; Brig. General Robert H. Wylie, General Paul Malone, Commodore and Mrs. Russel Ihrig, USN (ret.), Governor and Mrs. Earl Warren, Mayor and Mrs. Elmer Robinson, Mr. and Mrs. John E. Cushing. Mr. and Mrs. L. C. Fleming, Mr. and Mrs. Hugh

Pictures below were taken at the Mariners Banquet on Maritime Day

Pictures at the left:
Top picture includes T. R Krugur, American Mail; Capt. Ahrens, American Mail; C. A. Raab, Fort Mason, Ben Blount, Fort Mason.
Second picture, left to right: R. Jones, American President Lines; N. W. Brown, N. W. Brown Co.; M. Levine, Moore-McCormack; T. E. Brewer, N. W. Brown Co.; C. Cahill, Sudden & Christenson; M. Polvere, J. H. Winchester & Co.; D. De Berry, American Hawaiian; Bob Blatt, Sudden & Christenson.

Third picture, left to right: Bill Ingram, General Engineering and Dry Dock; Jim Camp, SOPAC; Comdr. Bob (Henry V.) Barbieri, U. S. C. G.; Captain Edward Groeper, Bar Pilot; Ed Senter, Sup't. Engineer, Grace Line; Ed Hough, Hough & Egbert Co.

Bottom picture includes Captain Charles G. Hansen, Capt. Charles Peterson, Warren Brown, Robert Y. Schrim, H. S. Sawyer, Capt. F. C. Gaidsick, Capt T. Smith, Capt. L. E. Hawkins, John Kilpatrick, Robert H. Wylie; Capt. Albert T. Berry.

Pictures at the right:
Top picture, snapped at one of the parties preceding the banquet—left to right: Mark Pomeroy and Ray G. Scoggins, Jones & Laughlin Steel Corp.; Paul Faulkner, PACIFIC MARINE REVIEW; Ira Head and Ed Ramey, Luckenbach S.S. Co.; Berry E. Dunn, Ralph V. Scott, Robert G. Allen, Pacific Co., Inc.; B. N. De Rochie, PACIFIC MARINE REVIEW; Fred Cordes; Ross Marble; John Cordes; Joe Granville, Hillcone S.S. Co.; Squatting in hole is J. M. Costello, President, J. M. Costello Supply Co.
Included in the second picture are Van Sickle, Pope & Talbot; E. Harms, Pope & Talbot; H. Potter, Atlas Paint; J. Eagen, Harbor Supply; H. S. Pemiebaker, Pacific Tankers; J. Chambers, States S.S. Co.; V. M. Kruger, Olympic S.S. Co.
Third picture: Ed Graff, Port Engineer, Grace Line; W. T. Lion, Port Captain, Pacific Far East Line; Captain Blackstone; Bern De Rochie, PACIFIC MARINE REVIEW; Jim Stasek, Assistant Port Engineer, Pacific Far East Line; Frank Dwinnell, Industrial Relations Manager, Pacific Far East Line.

Bottom, left to right: H. Bostwick; Shephard B. Hanley, American Hawaiian; Joe Bisbiglia, American President Lines; Dave Hart, American President Lines.

Snapped at the speaker's table, Maritime Day luncheon at the Commercial Club, were the groups above. Top left, left to right: Commodore Russell Ihrig, Supt., California Maritime Academy; Rear Admiral Donald S. Beary, Commandant, 12th Naval District; General Robert Wylie, Manager, State Board of Harbor Commissioners. Top right, left to right: Joe Moore, Jr., President Moore Dry Dock Co.; Senator Gerald O'Gara; Col. Fenton S. Jacobs, Comdr., S. F. Port of Embarkation; Lloyd Fleming, Pacific Coast Manager for Maritime Commission; Fletcher Monson, President, Mariners Club. Bottom left, left to right: Capt. Henry Blackstone, Chairman, Board of Governors, California Maritime Academy; George Killion, President, American President Lines; Fleet Admiral Chester Nimitz. Bottom right, left to right: Fleet Admiral Chester Nimitz; Governor Earl Warren speaker of the day; E. Russell Lutz, Vice President of American President Lines and Maritime Day Chairman.

Gallagher, Mr. and Mrs. Lester S. Day, Mr. and Mrs. Charles Wheeler, Mr. and Mrs. Joseph A. Moore Jr., Mr. and Mrs. Robert Mayer, Captain and Mrs. Malcom E. Crossman, USMC; Mr. and Mrs. Ray Sorenson, Mr. and Mrs. Ragnor Kjeldahl, Mrs. Henry Dipple Jr., Mr. and Mrs. N. Pieper, Messrs. E. Russell Lutz, James S. Hines, A W. Gatov, T. Douglas MacMullen, Fred L. Doelker, Lewis Lapham, Campbell McGregor, Clay Mills, M. A. Cremer, and Captain Charles F. May.

Dowling Appointed by W. P. Fuller & Co.

Thomas Lawrence Dowling has been appointed Southern California District Sales Manager of W. P. Fuller & Co., succeeding the late M. G. McKinlay.

Dowling began his business career with the pioneer paint, glass and wallpaper firm as a clerk in the Glass Department of the Oakland branch in 1917. Working his way up in the company to Paint Sales Manager in Oakland in nine years, he stayed there until he was promoted to managership of the San Jose branch in 1936. He became Paint Sales Manager in Seattle in 1944, and went on from there to manage the Stockton branch until his recent appointment.

Succeeding him in Stockton is I. W. Tabler, who has been Paint Sales Manager of the Fuller San Diego branch for the past two years.

James P. Fraser, formerly assigned to aircraft and shipbuilding sales and service, takes Tabler's place as Paint Sales Manager in San Diego.

Thomas Lawrence Dowling

Harbor Sightseeing Deserves Support

Harbor Tug & Barge Company, pioneer Bay Area tow, barge and waterway transportation firm, announced this month it was moving forward with "an expansion program in the field of passenger transportation and sightseeing service" with the christening of the *Harbor Sightseer* May 14 by Mrs. Frank E. Marsh, wife of the Bay Area Council General Manager. In June, the sister ship *Harbor Tourist* will be launched.

Claimed to be the first commercial small draught, 230-passenger glass enclosed twin screw boat of its type built in Bay shipyards, the *Harbor Sightseer* was launched from the Harbor Tug & Barge Company's yards in Alameda. It was constructed by Orlando Pasquinucci under the direction of Lester C. Bedient, H. T. & B. Co. general manager.

The 38-ton craft is 64 feet 4 inches long, 18 feet beam, and has a cruising speed of approximately 12 to 14 miles per hour, powered by twin Gray General Motors 671 Diesels of 165-HP each—with 3 to 1 reduction and reverse gear—has propellers 37½ by 28½ inches. She carries 1,000 gallons of fuel for 50 hours running time.

Built of extra heavy-duty consrruction designed to provide maximum safety and smooth riding, the *Harbor Sightseer* is enclosed with plate glass windows 42 by 46 inches, and is equipped with seats for 228 persons which can be arranged to provide space for dancing. A portable bar is available for use on special charter parties. Public address equipment is installed to provide narration on points of interest.

The *Harbor Sightseer* and the *Harbor Tourist* will supplement the three smaller glass enclosed water taxis the company uses in regularly scheduled one-hour sightseeing tours from Pier 41, and for water taxi service to Albany when Golden Gate fields is in session. This sightseeing service was started March 1947.

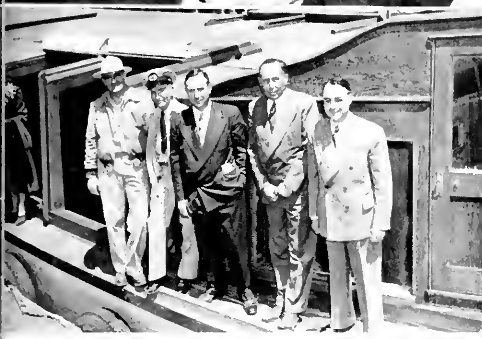
The company also operates a fleet of seven more water taxis for use in transporting stevedores, ships' crews, shipyard workmen and passengers to and from ships in stream.

Stemming from the days of Henry C. Peterson, who over 70 years ago in San Francisco was known far and wide as the Whitehall boatman, Harbor Tug & Barge Company was formed from the consolidation of the Henry C. Peterson Company and the Oakland Launch and Tug Company in 1925.

Major operations of the Harbor Tug & Barge Company include towing and passenger transportation divisions. In the commercial field, the company operates a fleet of 12 tow boats, 30 lighters. Radio telephone equipment is used on 3 tow boats and 2 water taxis. The company assists in docking and undocking ocean-going vessels, tows floating equipment and materials and carries a million tons of sugar beets yearly besides transporting rock, supplies and produce throughout the inland waterways of San Francisco Bay and Tributaries.

Albert D. Elledge, President of the firm, heads the official family composed of Lester C. Bedient, General Manager in charge of Operations, over 20 years with the company, and Harold Frohn, Assisrant General Manager in charge of Passenger and Sightseeing Service.

Mr. Elledge has held this post since 1941. He is active in harbor promotion, devoting much of his time in cooperation with martime, state, civic and commercial



Top, left: Left to right, Gen Robert H. Wylie, Manager, State Board of Harbor Commissioners, Mrs. Walter Oswald and Mrs. M. B. McGowan enjoying a chat during the maiden voyage of the Harbor Sightseer.
Top, right: Left to right, Mrs. Robert Stanton, Mrs. Edward Genberg, Mrs. Orla St. Clair and Mrs. Frank Marsh, shown on the Harbor Sightseer during her maiden voyage.
Bottom, left: Left to right, R. W. Lees, D. F. Stewart, L. C. Bedient, Harold Frohn and Albert D. Elledge, President, Harbor Tug & Barge Co., aboard the Harbor Sightseer.
Bottom, right: Christening of the Harbor Sightseer by Mrs. Frank Marsh in Bay Area Council ceremonies preliminary to World Trade Week.

groups interested in harbor developments. His prime interest is the improvement and modernization of our docking facilities which he believes will lead to a more expeditious and economical handling of cargo for shippers and carriers.

The Harbor Tug and Barge Company supports the position of this journal for greater active interest in San Francisco Bay problems which it is contended will lead to a faster development of the harbor's potentials.

Mr. Elledge says, "Guided narrated tours on the bay tend to promote this interest in our harbor facilities. Not only visiting tourists and business firms but the thousands of inhabitants in this area that do not appreciate our natural advantage have the opportunity of viewing the many points of interest about the bay from the water. We are happy to have a part in contributing to the promotion of this interest by offering our sightseeing tours."

Reorganization of United Engineering

Reorganization of the United Engineering Company following relinquishment of its Alameda shipbuilding facilities to the Todd Shipyards Corporation is announced by Raymond P. Hasenauer, company president.

George A. Wilson was named general manager and vice president, R. F. Charlton was named vice president, E. E. McClaran was elected treasurer, R. W. Smith was made secretary and A. C. Fiddy elected assistant treasurer and assistant secretary.

United is a wholly owned subsidiary of the Matson Navigation Company and now conducts its ship repair facilities and commercial manufacturing activities at 500 Beale Street in San Francisco.

Raymond P. Hasenauer

COASTWISE LINE
IN MODERN HEADQUARTERS

W. T. Sexton, Sr., president of Coastwise, who entered the steamship industry in 1908. He first became associated with the late Kenneth Dawson in the old Columbia Pacific Steamship Company in 1920 and became vice president of the States Steamship Lines, successor to the Columbia Pacific. In 1936 he and Dawson organized the Coastwise Line. He became associated with United States Lines in San Francisco in 1937 as Pacific Coast manager and in 1943 he helped organize Pacific Tankers, Inc., of which he was vice president. One of the organizers of Pacific Far East Line, Inc., Sexton was president of the company. In 1945 Sexton organized West Coast Terminals in association with W. J. Bush, Dawson and others. He has also been operating Columbia Basin Terminals at Portland since its organization in 1935.

Because of its ever-widening scope of operations, Coastwise Line and its allied interests, Coastwise Pacific Line, and Coastwise Bulk Carriers, recently took over the entire building at 150 Sansome Street, San Francisco, which was remodeled to meet operational and traffic needs. With the exception of pier personnel, the new headquarters house under one roof the entire headquarters organization of the three companies, including executive, financial and freight accounting offices, for greater convenience to the shipper.

Coastwise Pacific Line currently operates a fleet of nine vessels on a worldwide basis, and also does extensive agency work. Under the corporate name of Coastwise Line it operates two vessels in a limited Pacific coastwise service. This service is operated at a loss to protect large water shippers with extensive tidewater installations. For if these shippers are not afforded temportry relief water service, they inevitably would be compelled to convert their installations to rail, thereby losing this trade forever to the coastwise water industry. As soon as the Interstate Commerce Commission revises coastwise water rates to a compensatory level, Coastwise Line will resume regular full time service, which it maintained successfully with six vessels for ten years prior to the war.

Coastwise Bulk Carriers, the newest of the group, was organized this year. It operates two tankers in domestic and offshore trades and has applied for a third.

The Company has district offices in Los Angeles and Portland and in Seattle under International Shipping Company, Inc.

B. H. PARKINSON, executive vice president and secretary-treasurer. At the time the company was organized in 1937, Parkinson brought with him to the group seventeen years of experience in all phases of public utility operations, including transportation. He was named treasurer when the company was first organized, later general manager, and more recently appointed executive vice president.

Upper left: Headquarters of Coastwise Line in San Francisco.

Upper right: Main traffic office located on the ground floor at the entrance to the building. Chartering service is also maintained in this office. Private offices of executives are to the left, out of view of the camera. These include R. S. Kimberk, vice president in charge of foreign services; H. M. Kelly, manager of coastwise services; C. V. Lynch, freight traffic manager; and W. T. Sexton, Jr., assistant to the president.

Lower left: Operational office on the ground floor. Here are located offices of Captain V. D. Trout, vice president in charge of operations; A. G. Safholm, general superintendent; Captain D. G. Flint, port captain; G. F. Voyer, port engineer; Dewey Paine, purchasing agent; and O. O. Britton, paymaster.

Lower right: General accounting offices on the second floor under the direction of R. N. Duncan, assistant treasurer.

ladiomarine Appoints Butt

Radiomarine Corporation of America recently announced the appointment of Harvey R. Butt as manager of their Washington office at 1625 "K" Street, N. W.

Murphy Appointed By Luckenbach

Harold J. Murphy has been appointed Marine Superintendent of the Los Angeles office of Luckenbach Steamship Company, Inc. He replaces L. J. Miller who has resigned.

Crane Packing at Portland

Marine & Industrial Supplies & Service, Inc., 2501 N. W. Front Ave., Portland, have been appointed representatives of the Crane Packing Company in the Columbia River area. Fred Miller is head of the Portland firm.

NEWS FLASHES

STANDARD ORDERS FIVE BIG TANKERS

A plan to build five of the world's largest tankers at a cost of approximately $30,000,000 is announced by T. S. Peterson, president, Standard Oil Co. of California.

They will have a deadweight capacity of 28,000 tons and a volume capacity of 240,000 barrels, Peterson said.

Largest of the tankers now operated by Standard or its subsidiaries has 18,000 tons deadweight capacity and can carry 150,000 barrels.

The vessels will be built at the Quincy, Mass., yards of the Shipbuilding division, Bethlehem Steel Co.

Delivery is for 1950-51.

* * * * *

KILLION TO CONFER ON NEW LINERS

George Killion, American President Lines' president, left for Washington, D. C., to meet with the Maritime Commission on APL's proposed round-the-world passenger vessels.

Negotiations for the five round-the-world liners have gone on for several months but appear to be reaching a climax, Killion said.

* * * * *

GUNETTI COMPLETES WESTINGHOUSE ASSIGNMENT, REJOINS HENDY

Harry C. Gunetti, prominent in Santa Clara County industrial and civic life for many years, announces completion of his temporary assignment as general manager for the Westinghouse Electric Corporation's Sunnyvale Works and his near-future return to the Joshua Hendy Corporation as Assistant to The President.

* * * * *

HOUSE GROUP OK'S NEW GIANT CARRIER

A House armed services sub-committee approved unanimously a bill clearing the way for the Navy to get started on a 65,000-ton giant aircraft carrier.

Navy authorities say the super carrier, capable of cruising in Arctic waters, would be the largest ship of any type over built. It would be about half again larger than the Navy's present biggest carriers. Up to four year would be required for its construction.

The carrier will be about 10 feet longer than was the Normandie. Its waterline length will be 1,030 feet, compared with the present top carrier length of 900, and the overall length, including the overhang of the flight deck, will be 1,090 feet.

Navy estimates have placed the probable final cost all the way from $125,000,000 to $200,000,000, and Navy builders have said it may eventually be an 80,000-ton ship.

* * * * *

$1,000,000 FACTORY FOR GENERAL METALS

Another million dollar industrial plant for the Los Angeles area is announced.

The plant, designed for production of malleable iron castings, is being erected by General Metals Corporation, adjoining its present facilities in Vernon. It is scheduled for completion in September.

* * * * *

MOORE ADDS PORTABLE D. D.

Moore Shipbuilding & Dry Dock Co. of Oakland has purchased a portable dry dock from the Navy and has mounted it in the present Moore yard for handling the smaller types of craft.

* * * * *

FOUR GOOD SIGNS

Four encouraging factors for America's shipping future were recently reported in a special article by the N. Y. Journal of Commerce. The Marshall Plan offers a continued volume of trading with United States' greatest markets for the next three to four years, American shipping being promised a 50-50 share in the business. Private orders for tankers and wider support for liner building in Washington has offered encouragement to shipyards. A succession of limited rate increases has bolstered the position of intercoastal shipping lines. Finally, bills have been introduced in Congress aimed at putting the merchant marine on a firmer foundation.

* * * * *

ONE BUSY YARD'S WEEK IN SAN FRANCISCO BAY AREA

Vessel	Owner	Nature of work
USAT Frend C. Ainsworth	Army	Conversion
MY Hilo	Pillsbury & Martignoni	Survey
USAT Frederick Funston	Army	Conversion
SS Comet	United States Lines	Recondition Survey
USAT James O'Hara	Army	Conversion
USHS Comfort	Army	Conversion
Dredge Neptune	Olympian Dredging Company	Miscellaneous repairs
SS Hawaiian Pilot	Matson	Repairs & alterations
MV Ravnanger	Westfal-Larsen	Drydock & mis. repairs
SS Pan American Victory	American President Lines	Drydock & bottom repairs
SS Santa Juana	Grace Line	Miscellaneous repairs
SS George Eastman	American President Lines	Drydock for survey
PC 1586	Standard Oil	Layup & survey
PC 1599	Standard Oil	Layup & survey
PC 1587	Standard Oil	Layup & survey
PC 1591	Standard Oil	Layup & survey

RUMOR DEPT.

There is a report that the ship scrapping program of the Maritime Commission will come to an end very soon.

* * * * *

TANKER CONSTRUCTION

As of May 1 there were at least 32 tankers under contract with shipyards in the United States, with at least five added since that date and prospects for many more.

* * * * *

STEAMSHIP COMPANIES ARE BUYING SHIPS

In its monthly summary of the U. S. flag fleet, the National Federation of American shipping shows an increase of 31 in privately owned vessels between April 1 and May 1. The May 1 figure was 1132, of which 673 were dry cargo and 459 tankers.

During May, 27 vessels were added to the privately owned fleet bringing the total to 1159. Of these, 681 were dry cargo and 478 tankers.

* * * * *

SOUTHERN CALIFORNIA INDUSTRIAL DEVELOPMENT

During the month of May, 17 new factories were established in Los Angeles County with a total investment of $1,447,000, and creating 210 new jobs for factory workers. Twenty-seven (27) existing plants were expanded, calling for an additional investment of $5,943,000, and creating new industrial jobs.

Total investment in the 44 new and expanded units was $7,390,000, creating a total of 778 new jobs.

For the year to date, 77 new factories were established with a total investment of $8,786,000 and creating 2,964 new jobs; 146 plants were expanded, calling for an additional investment of $28,640,500, and creating 2,766 new industrial jobs.

Total investment for the year to date in the 223 new and expanded units was $37,426,500, creating a total of 5,730 new jobs.

* * * * *

TODD LOW ON WEST COAST SHIPS

Todd Shipyards Corp. was apparent low bidder on the Army Transport "Walker" and the Maritime Commission's AKA "Rankin". If the bids are accepted, one vessel will go to the new Todd yard on San Francisco Bay and the other to the Todd yard at San Pedro, Calif.

LEMLER NAMED VICE PRESIDENT AND GENERAL MANAGER OF TODD PACIFIC SHIPYARDS

John D. Reilly, president of Todd Shipyards corporation, has announced the election of Philip Lemler as a vice president and general manager of the Company's San Francisco Bay area operations effective July 1, 1948. Simultaneously, Mr. Reilly stated that the Board of Directors of Todd Pacific Shipyards Corporation also has appointed John D. Reilly, Jr. assistant general manager and Joseph J. Redington, management consultant. Robert E. Christy was named a special representative of Todd's activities at Los Angeles, San Francisco and Seattle.

Todd recently commenced operation with modern shipyard facilities and dry docks at Alameda and with Pier 36 and shop facilities on Beale Street, San Francisco.

Philip Lemler was born in New York City in 1900 and graduated from the United States Naval Academy in 1919. Following a course at the Post Graduate School of the Academy, he graduated from the Massachusetts Institute of Technology in 1923. He served in the Navy Yard, New York on two different assignments for a total period of nine years. While there, he was in charge of the new construction of the cruisers, *U. S. S. Brooklyn* and *U. S. S. Honolulu.* He also served for three years at the Navy Yard, Philadelphia, where he was Shop Superintendent. He was an instructor at the Naval Academy for two years in the Department of Electrical Engineering.

The start of World War II found Mr. Lemler on duty in the Bureau of Ships in the Navy Department at Washington. He organized the Facilities Section of the Bureau and was charged with the direct supervision of the wartime expansion of all Navy Yard facilities. In addition, he had full charge of new construction facilities in all yards building ships for the Navy. As far as ship repair was concerned, he was responsible for providing the necessary facilities for repairing all Naval and commercial ships in the Continental United States and at the Pacific Island bases. He developed the requirements for floating dry docks, from the small 1,000-ton dry docks up to the gigantic sectional 80,000-ton dry docks.

In July 1946, Captain Lemler left the Bureau of Ships for the San Francisco Naval Shipyard and assumed its direction in October of that year. His voluntary retirement from the Navy takes effect on July 1, 1948.

John D. Reilly, Jr. graduated from the Sheffield Scientific School of Yale University in June 1940. Subsequently, he was employed in various engineering and executive capacities at the Seattle-Tacoma Shipbuilding Corporation and the Charleston Shipbuilding and Dry Dock Company. During World War II he served in the U. S. Naval Reserve as Ensign and Lieutenant (j.g.) and was assigned to the Philadelphia Navy Yard as an

Capt. Philip Lemler

Photo courtesy of Todd Shipyards Corp.

inspector of shipping. In 1946 Mr. Reilly joined the Hoboken Division of Todd Shipyards Corporation and in 1947 was made assistant general manager of that plant.

Joseph J. Redington has been associated with Todd Shipyards since 1941 in the New York and Los Angeles areas in executive capacities.

Robert E. Christy is well known in the West Coast maritime industry and was associated with the Matson interests as the Vice Chairman of their United Engineering Company, San Francisco, until recently, when Todd took over their shipyard properties.

Todd Shipyards Corporation is at eight ports in the United States and in Barranquilla, Colombia, South America. Yards in the Gulf ports and on the East Coast include Galveston, New Orleans, Charleston, S. C., Brooklyn and Hoboken.

Mr. Reilly pointed out that the acquisition of the Alameda plant, pictured in the May PACIFIC MARINE REVIEW, and the San Francisco plant, fills a long-felt desire for his world famous organization to be represented in the important port of San Francisco and completes the chain of Todd's West Coast yards. Todd has been operating at Seattle since 1916 and at Los Angeles since 1943. Mr. Reilly said that Todd is no stranger to San Francisco, having maintained an office in the city at 486 California Street, for four years. For a short time during the war, Todd was building ships at Richmond, California.

CORDAGE FIBERS

Modern rope makers use fibers from 15 to 20 countries to produce the various types of cordage used in industry today, the Columbian Rope Company reports.

EARLY AMERICAN ROPE-MAKING

Rope-making was one of the first industries in colonial America, the Columbian Rope Company reports. John Harrison of Boston was producing rope commercially in 1630.

KEEP POSTED

New Equipment and Literature for Yard, Ship and Dock

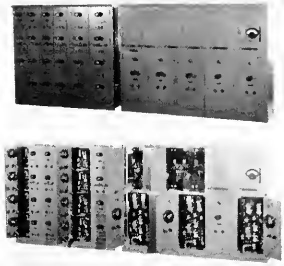
Modern Centralized Motor Controls for Marine Service

The Ward Leonard Electric Co., Mount Vernon, N. Y., has currently improved and modernized its complete line of centralized motor controls for marine service.

The centralized control board shown in the illustrations is a typical example of one of these newly improved units. They were built by the Ward Leonard Electric Co. for the Carrier Corp. for installation on eight Matson Navigation Co. C-3 freight vessels.

Conforming to A. I. E. E. Marine Specifications and the American Bureau of Shipping Rules, the group control board provides centralized control of 29 d.c. motors ranging in size from 2 to 60 horsepower. The various motors drive pumps, compressors and fans on the ship's refrigeration and air conditioning systems.

The complete control unit, which is divided into two sections for ease of handling, measures approximately 196" long, 81" high, 29" deep.



Centralized Motor Controls

Angle iron framework, sheet steel doors and removable covers form a sturdy drip-proof enclosure and provide adequate protection to the control components. Each section is equipped with four removable lifting rings to facilitate handling during installation. Wooden hand rails mounted on the doors comply with marine safety regulations.

Water Repellent Ignition Seal

Research and improved development were recently completed for General Motors Corporation's Coach and Bus Division, on a water repellent ignition seal to be distributed by General Motors. Developed by Sherolite Products, Inc., Caldwell, N. J., the product functions primarily as a protective coating on metals, wires, and electrical systems against such corrosions and damages as are effected by water, condensation, leakage, acid, fungus, and rust. As a water repellent coating, Sherolite is a preventative of the aforementioned hazards, and in its early form accomplished a man-sized job of protecting marine, aviational, and vehicular engines and metal parts from the ravages of weather and heavy duty during World War II.

In its improved capacity, Sherolite is a thin, workable liquid applicable to metals and electrical wires or connections by spraying or brushing at room temperature. It dries tack-free in 8 minutes, and hard in 45 minutes, forming a lasting coat. Since it contains no petroleum derivative, Sherolite neither attacks nor softens even synthetic rubber, such as hose connections, grommets, or wiring insulation of low rubber content, but protects these substances by repelling all liquids or corrosive elements.

Dealer agencies in California are still open. Hough & Egbert Company have been appointed marine distributor for California and Hawaii.

Descriptive Folder on Welding Instruction Books

The Air Reduction Sales Company has a descriptive folder which describes in detail five available welding and cutting instruction books.

According to the publisher, these books, crammed full of material based on Airco's thirty years of experience in the welding and cutting field, will prove valuable informational and instructional sources for students, instructors, professional welders, and design engineers.

Two volumes are devoted to arc welding, and two to oxy-acetylene welding and cutting. The fifth book is "Manual of Design for Arc Welded Steel Structures," a 300 page definitive work, the first of its kind ever published.

Hydraulic "O" Ring Data Book

Most recent technical publication of the Crane Packing Company, Chicago, is their bulletin, "John Crane Hydraulic 'O' Rings", which gives the design engineer complete data on the recommended groove dimensions, clearances, finishes, temperatures and pressures for successful performance of John Crane "O" Rings. The manual contains tabulations of compound specifications and drawings showing typical problems of "O" ring usage.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

..............................issue. Page No..............

....

....

....

(Identify by name of manufacturer and catalog)

NAME..............................

BUSINESS..............................

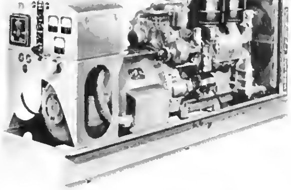
ADDRESS..............................

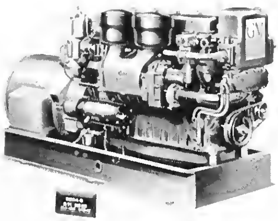
....

WIDE RANGE IN GM DIESELS

In presenting its latest models of General Motors Series 71 Diesel generator sets for marine use the Detroit Diesel Engine Division has made available an exceptionally diversified selection of electric power plants ready to meet a wide range of shipboard requirements. Each of these compact and completely self-contained units consists of a GM Series 71 Diesel engine direct connected to a single bearing generator and mounted on a fabricated structural steel base. They are offered in 2, 3, 4 and 6 cylinder sizes having continuous ratings of 20, 30, 40 and 60 KW respectively, and operate at 1200 R.P.M.

In order to introduce the maximum amount of flexibility into the line all units from 20 KW to 60 KW have been made available with two types of cooling. The selection includes radiator cooled models which can be mounted at any height above the water line and heat exchanger equipped sets for installation in those parts of a ship having ready access to sea water supply. Power generators are designed for full load continuous operation at 50° C ambient temperature and are of drip proof construction.





Above: 60 KW General Motors generator set radiator cooled shown with control cabinet and automatic starting equipment.

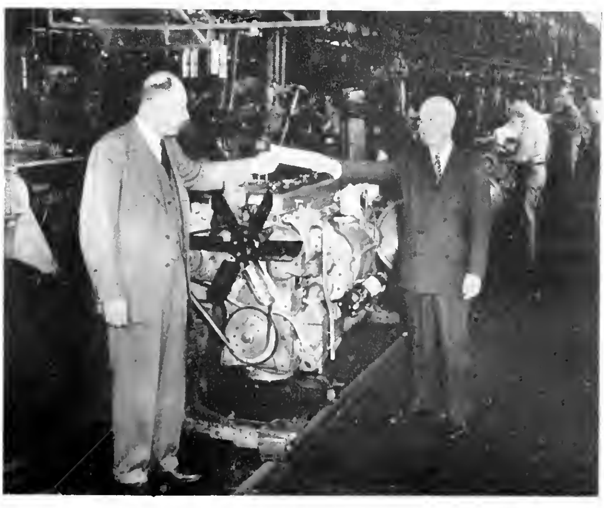
Below: 60 KW General Motors Diesel marine generator set with heat exchanger cooling.

250,000 MARK REACHED

An important milestone in the production and use of Diesel engines was reached on March 30th when the manufacture of the 250,000th General Motors Series 71 2-cycle Diesel engine was announced.

The quarter of a million engines produced by this one factory represent an impresive total of over 40,000,000 horsepower; four times the total Diesel horsepower that was in existence in January 1938 when the Division first started operations. The figure is estimated by engineers to be sufficient to power 190 ocean going ships comparable to the Queen Elizabeth.

The introduction of G.M.'s light weight, high speed, automotive type Diesel engine has spearheaded a decade of Diesel industry growth unmatched since its birth in America just 50 years ago. To Detroit Diesel Engine Division belongs much of the credit for pioneering the principles of mass production in this industry. Today such vital enterprises as transportation, construction, road building, petroleum, lumbering and marine rely heavily on Diesel power to produce and distribute hundreds of basic products essential to our everyday existence.



George A. Zink, Works Manager of the Detroit Diesel Engine Division, delivering the 250,000th GM Diesel engine to V. C. Genn, General Sales Manager. The unit will be shipped to the Euclid Road Machinery Company in Cleveland, Ohio.

INTERNATIONAL NICKEL BOOKLET

The International Nickel Company, Inc., New York, recently published a new booklet, "66 Practical Ideas for Metal Problems In Electrical Products". Thirty-six pages long, the booklet lists almost 100 service stories showing how electrical manufacturers have used high nickel alloys to overcome corrosion, heat, vibration fatigue, wear and other performance hazards. Problems were all selected from actual production in all electrical fields including general manufacturing and electronics, special devices and appliances.

Also included are special operational problems such as high temperature, corrosion, formability, abrasion, fatigue strength, magnetostriction. Nearly 100 photographs illustrate the text.

LIFETIME BRAND WATER RATION

Weeks-Howe-Emerson Company, 255 Mission Street, San Francisco, recently announced that they now have in stock the new approved Lifetime brand pure drinking water.

Developed, canned and distributed by The Multiple Breaker Company, Boston, this water ration is the result of extensive research conducted by the company's chemists cooperating with various government agencies. It has been accepted by the U. S. Coast Guard and other government agencies as standard equipment.

LAMINATED PLASTIC SPORT BOATS

By C. A. HERBERTS, President, Wizard Boats, Inc.

An outstanding new design and construction in boat building has been recently developed by The Wizard Boats, Inc., of Costa Mesa, Cal., who have concentrated for the past several years on the development of laminated plastic sport and speed boats.

Until very recently little was done to find better and more suitable materials for the construction of hulls which are subject to the hardest wear by the elements of nature—weather, water, heat, cold and sea growth. The majority of sportsmen's small boats for fishing and hunting are of wood construction and therefore subject to water logging, dry rot, expansion and contraction. Steel boats of the sportsman type are too heavy and not buoyant whereas those of aluminum construction are not shock absorbing and resilient and soon become battered up.

Wizard's method is first, to design the required boat, and then to build the molds. These molds are covered with many layers of muslin, woven spun glass, glass mat and hemp sisal, all of which are tremendously strong in themselves. Each and every layer is impregnated with synthetic resin and other chemicals which are then integrated into a one-piece unit or hull. The next step is to place these molds, with the molded, laminated hull upon the same, in huge ovens where they are cured at 220 degrees for a certain period of time, depending upon the size and style of boat and the number of laminations employed. This curing is similar to that of an automobile tire.

Just recently Wizard concluded a series of severe tests to satisfy themselves that the hulls can take real punishment. A 12 ft. boat was thrown from a two-story building several times upon a concrete sidewalk. The only damage was one broken, wooden gunwale. Then the hull was turned upside down and hit several hundred times with a 16-pound sledge.

Next a plank was laid upon the bottom of the hull, as shown in the picture, and an automobile was driven upon it until the hull caved in under the tremendous weight, which was expended in one spot. After the car was withdrawn, the hull immediately regained its original shape, because of its being resilient to shock. The next test was that of shooting 22 short caliber bullets into the bottom of the hull at a distance of approximarely 20 feet. These bullets penetrated only a little more than halfway. After these severe tests, the hull was then equipped with seats and an outboard motor, tested in Newport Bay, and found to be leakproof.

Wizard boats, which are in sizes from 8 ft. to 15 ft. inclusive, have features heretofore unknown to the boating industry. They have one-piece plastic laminated hulls; they are shock absorbing and resilient with no seams to open and no joints to leak, no caulking or bailing and

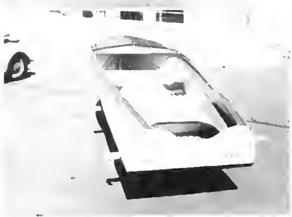
Fleet of Wizard Lehman Sailing Dinghies.

no dry rot, no scraping. In addition to being lightweight and durable, they are heat and cold resistant and not subject to sea growth.

Prices upon these boats are comparable to any high grade boats on the market and they have a full endorsement by the Balboa Yacht Club, the Newport Harbor Yacht Club and many others.

Wizard Boats, Inc. is interested in securing dealers in various territories. Further information may be had by writing the company at P. O. Box 246-P, Costa Mesa.

Top: Throwing Wizard boat off top of a building.
Center: After boat hit the ground, only damage was broken gunwale.
Bottom: Wizard boat being hit with a 16 lb. sledge hammer. The only damage was a piece of paint flaked off, which camera happened to catch.



Top: Shooting 22 high velocity bullets into the hull of a Wizard boat, which penetrated only a little more than halfway.
Center: Automobile being driven on a plank, collapsing the hull. After car was withdrawn the boat regained its normal contour.
Bottom: The inside of Wizard 15 ft speed boat.

Top: The bow of the 15 ft. speed boat.
Second. The 12 ft. SPORTSTER for fishermen and hunters.
Third· Same boat with Top-O-Car Carrier.
Bottom: 8 ft Yacht Dinghy.

LUCKENBACH APPOINTS MARINE SUPERINTENDENT

Luckenbach Steamship Company, Inc. recently announced the appointment of Ronald Horne as marine superintendent in their Seattle offices.

ARRIVED THIS PORT!

Popular Charlie W. Nelson, District Manager for Crane Packing Company, at San Francisco, passed around the cigars on May 14 heralding the arrival of his husky little son—Carey Havelock Nelson.

BYNUM APPOINTED

Appointment of O. W. Bynum as General Sales Manager of Carrier Corporation, manufacturer of air conditioning, refrigeration and industrial heating equipment, was announced recently by A. P. Shanklin, Vice President in charge of the Sales Division.

Since 1946 Bynum has been Manager of Direct Sales. In his new assignment, he will continue these duties in addition to directing the overall line organization of the Sales Division under Shanklin.

Bynum joined the Carrier organization in 1930 as a student engineer and has since served in engineering, sales and management capacities in the Dallas Atlanta and Chicago districts.

PACIFIC TANKERS BUYS RAYTHEON RADAR

Pacific Tankers, Inc. has purchased two Raytheon 10-centimeter Pathfinder Radars for their tankers *McKettrick Hill* and *Montebello Hill*.

They operate seventeen Navy tankers equipped with these radars.

Palmer-Shile Corrugated Box

Ideal for moving or storing heavy metal parts, the Palmer-Shile Company, Detroit, designed and built the box (above) of heavy corrugated steel; legs are designed to permit complete accessibility with fork or power lift truck. It is made in any size or load capacities to meet buyers specifications.

High-Strength Chrome-Base Concrete

A high-strength, chrome-base refractory concrete, known as Kromecast, which is able to withstand temperatures as high as 3100 degrees F., has been developed by The Babcock & Wilcox Company, officials of its Refractories Division have announced. The new product is of major importance for industrial furnaces because it makes available an easily installed concrete combining the refractory and slag-resisting properties of chrome-base materials with the ability to support loads at high temperatures.

Kromecast, which can be poured into place as easily as ordinary concrete or applied by plastering or with cement gun, possesses exceptional volume stability at temperatures up to 3100 F, while providing protection against attack by fuel slags, metallurgical and chemical slags, molten materials and other reactive products. The new product makes the desirable qualities of a chrome-base refractory available for many applications in which such a material cannot now be used. Kromecast can be installed in a fraction of the time required for plastics and, because of its strength at elevated temperatures, can be used to construct vertical walls and roof arches in many types of furnaces that formerly had to be made of less resistant materials.

For use in furnaces where temperature and spalling conditions are not as severe as those requiring the use of Kromecast, The Babcock & Wilcox Company announced a second new product, Hydrochrome.

This chrome-base concrete has a temperature use limit of 2800 F. and is recommended for the great majority of water-cooled boiler furnaces and for metal processing furnaces with moderate operating temperatures.

Ship Register Now Available

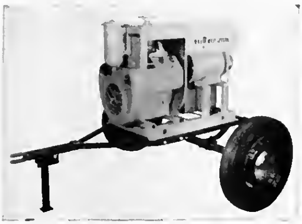
The 1948 issue of the ship register published each year by the American Bureau of Shipping is now available to subscribers. It is the 80th annual volume of the "Record of the American Bureau of Shipping", and contains almost 2,000 pages. The new volume tabulates detailed data on approximately 15,000 merchant vessels of the United States over 100 gross tons and outline data on 5,500 foreign flag vessels engaged in commerce with the Americas.

Of special interest and value to the shipping industry is the typical inboard profile plans of vessels constructed for the U. S. Maritime Commission and the Maritime Commission symbol designation which has been added to the detail "List of all merchant vessels of 2,000 gross tons and over built by each shipbuilder in the United States since 1914."

A separate listing of all American ship owners is included, together with the names and gross tonnage of vessels owned by each. The name and location of shipbuilding and repair plants is tabulated, together with number of building ways and capacity of dry docks and marine railways. The list of changed names of vessels, alphabetically indexed by all former names, is most useful in tracing vessels.

"The Record" is kept up to date by supplements issued twice a month, containing changes to existing vessels and additions of new vessels. There is also a Special Report Service that is issued daily to subscribers who wish information more quickly.

New Arc Welding Machine



Air Reduction Pacific Company announces the availability of the new Wilson "Wasp Special" air cooled, engine driven, arc welding machine.

The "Wasp Special" is designed to furnish a smooth steady current and to stand up under usual and regular duty factor load conditions in tough construction and maintenance jobs in many varied applications.

This new 200 ampere arc welder has a welding range of 25 to 250 amperes at 30 volts, 50% duty cycle. It is a lightweight machine that is easy to handle and ideal for work in places inaccessible to larger and heavier equipment. Two convenient outlets are provided which may be used for lighting purposes or to operate universal power tools in an emergency.

Eggers Distributor for V. J. Todd & Sons

George Eggers, well known in West Coast shipping circles, is now California distributor for F. J. Todd & Sons, specializing in marine chemicals. He has offices at 1 Drumm Street, San Francisco. His telephone number—YUkon 6-2013.

Handy Tool Kit

To provide ship builders and chandlers with a handy way to tackle a multitude of repair jobs, Ingersoll-Rand Company has just announced a compact, portable, all-purpose tool kit.

The kit includes the new electric impact tool—with standard accessories for nut-running and nut-removal, for drilling steel, masonry or wood, reaming, wire brushing for carbon-cleaning jobs, and equipment for applying and removing studs, tapping, driving and removing screws. The impact tool weighs only 6½ pounds, easily performs all of these jobs using standard attachments, and saves as much as 90% time on virtually all service jobs.

The kit is assembled complete or with accessories as required. With standard equipment, the kit contains the impact tool with a Jacobs collet type chuck, six hex sockets of varying sizes, a Morse Taper socket, and adapter sleeve.

CHAIN TONG WRENCH

The new E-Zee Chain Tong offers new features that should prove of interest to users of this type of wrench. In addition to the advantage of being instantly reversible, this ratchet action wrench has, according to its makers, 25% greater chain wrap than ordinary wrenches. The chain is of a type that they claim will not jam under pressure.

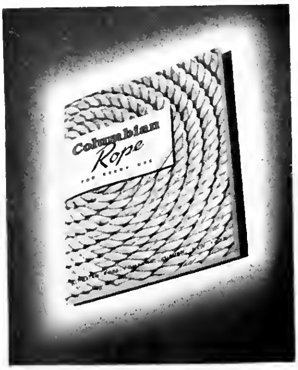
The makers recommend the E-Zee Chain Tong for handling pipe in corners, coils and banks—any tight spots where other wrenches cannot operate. It is provided with an adjusting bolt for the occasional job where a tight chain may be required.

This new wrench is pictured and described in a new catalog sheet issued by E-Zee Tool Manufacturing Corp., New York City.

COLUMBIAN ROPE CATALOG

Columbian Rope Company has issued a new catalog listing the complete line of its rope products.

The new catalog describes the various ropes made for marine, fishing, drilling, farming, and industrial uses, and miscellaneous special-purpose ropes. In addition, there is a section on plastics which describes Columbian's popular nylon, rayon and saran rope products. Designed to provide the buyer of rope with specifications and other practical information, the catalog also contains valuable data on cordage fibers, manufacture of rope, research and testing, and hints on use and care.



The new catalog, printed in color, is abundantly illustrated. It is $8\frac{1}{2}$ by 11 inches in size and runs to 64 pages.

NEW WIRE ROPE HOIST

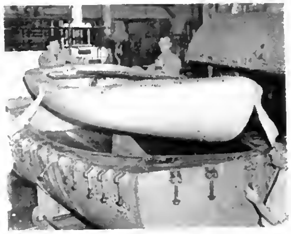
A new line of low-cost, low-capacity, wire rope hoists, designed to bring the advantages of cable and drum hoisting to a wider industry group, has been put out by the Yale & Towne Manufacturing Company.

The new light-duty hoist, known as the "Load King," will be available in ¼, ½ and 1-ton capacities. The frame of the portable hoist is a heavy, one-piece, ribbed-steel casting, constructed for use with lug, plain trolley, motor trolley, or winch-type mounting, and the hoist is equipped with a large-diameter drum with machine-cut grooves for guiding the cable as it winds. The specially - designed reversing - type motor is rated to operate under constant service with full load without destructive overheating.

Wire Rope Hoist

NEW PLASTICS SAILBOAT

A new 12-foot sailboat, with a one-piece plastics hull which is said to be 10 times as rugged and almost half as light weight as average wooden boats of the same size, was



Plastics Sailboat

shown for the first time at the annual Motor Boat Show in New York recently.

According to Beetle Boat Company, manufacturers of the craft, the new sailboat weighs only 300 pounds and accommodates six persons. Its unusual strength is gained from a glass matt material and a plastics resin from which the hull is molded in one piece by the General Electric Plastics Division at Pittsfield, Mass.

Designed with a flexible mast of aluminum which is said to decrease the possibility of capsizing, the boat is said to permit greater speed because of its light weight and the fact that the hull is molded in a single piece. It is non-sinkable, leak-proof, and requires practically no maintenance for the hull. It can be stored without regard to climate, is resistant to corrosion and decay, and is impervious to salt water and worms, it was said.

POCKET ELECTRODE GUIDE

Air Reduction Sales Company, New York City, has announced the publication of a new pocket guide to Airco arc welding electrodes which presents all the facts pertaining to the most commonly used Airco electrodes along with helpful data regarding the factors to be considered when choosing an electrode for a specific job.

The profusely illustrated, 4 x 8 guide is thumb-indexed for ready reference. Information on each electrode mentioned in the guide includes description, recommended application and welding procedure. Also included is a two-page NEMA standard color marking chart and an electrode comparison chart which matches up the various electrodes on the market with their respective A.W.S-A.S.T.M. classification.

A free copy of the guide is available from the company on request.

BOOK REVIEW

AMERICAN YACHT REGISTER, 1948 Edition, published by Lloyd's Register of American Yachts. Price $20.

Included in this 1948 Edition are more than 7500 listings, including sail and power craft. In the latter division the greater portion of new entries confirms the predicted trend to smaller yachts, with only a small percentage of those recently constructed exceeding 60′ in length.

A gradual influx of ex-government craft, now converted to peacetime pleasure purposes, will be noticed in some of the sizeable yachts which are making their initial entry in the current book. While many of the larger and more luxurious prewar steam and diesel yachts seem to have been removed from the category of pleasure craft—some of them having been converted to commercial purposes—familiar ones are returning to the fleet again.

More than 600 fresh entries have been added to the 1948 issue to compensate for the 400 odd that have been deleted during the past year, as obsolete, destroyed, etc. With the increase of cruising in both sail and power craft, the Yacht Club section becomes a valuable asset to the reader, with entries of many newly organized or reactivated clubs throughout the country listed for ready reference.

The lithographic flag plates now illustrate over 3000 private signals and 750 burgees, in many cases bringing into the picture for the first time the flags that have sprung into being during the postwar year. The flag plates only, bound separately, are available at $7.50 per copy.

Tanker, Salinas, Gets New General Electric Radar

F. P. Richmond, Port Engineer, is shown trying out the new General Electric "Electronic Navigator" just installed in the SALINAS pilothouse. This is model MN-IA, operating on a 10cm wave length, which is generally recommended for open sea work. 3cm operation is also available in the "Electronic Navigator", usually for ships plying inland waters. This unit was furnished and installed by Ets-Hokin & Galvan.

The SALINAS is the former Navy tanker HUDSONIAN, and was converted by the owners, the Hillcone Steamship Company, for West Coast runs. Ets-Hokin & Galvan also did the electrical conversion work on the vessel. Captain Perry K. Countryman is master of the SALINAS.

Cooper-Bessemer Announces Pacific Coast Sales Changes

Left to right: John McKissick, Phil Mettling, John Rogers, and Jim Combs.

Stanley E. Johnson, vice president and director of sales of the Cooper-Bessemer Corporation, Mount Vernon, Ohio, manufacturers of gas engines, diesels and compressors, recently announced the following rearrangement of the company's Pacific Coast sales organization.

John Rogers will continue as the company's Pacific Coast Manager with headquarters changed to San Francisco. Phil Mettling is serving as manager of the Los Angeles office, and John McKissick has been transferred from San Francisco to Seattle. James Combs has been transferred from the Mount Vernon sales department to the sales department in San Francisco.

Roach Appointed by Western Ship Service

Appointment of Perry Roach as Superintendent for the Western Ship Service Company's operations and service on San Francisco Bay has been announced by Murray Simpson, General Manager of the company.

Roach was formerly Superintending Engineer for the Williams-Diamond & Company and served as Port Engineer for the War Shipping Adminisrration at Halifax, N. S., and at St. Johns, Newfoundland.

Murray Simpson, general manager of Western Ship Service Company of San Francisco (left) and Perry Roach, superintendent.

"Who does not see then, that every year hereafter, European commerce, European politics, European thought and European activity, although actually gaining greater force and European connections, although actually becoming more intimate, will, nevertheless, relatively sink in importance, while the Pacific Ocean, its shores, its islands and the vast regions beyond, become the chief theater of events in the world's great hereafter."—William H. Seward, in the U. S. Senate, July 29, 1852, in advocating a survey of the Arctic and Pacific Oceans.

est Coast Engine

The West Coast Engine & Equipment Company, arine and industrial distributors for General Motors ries 71 Diesel engines, have opened a new and well uipped sales and service plant in Berkeley, California.

The site is Ashby Avenue close to the eastern terminal the San Francisco Bay bridge, easily accessible from ther San Francisco or Oakland.

Completely modern in every respect, the new Berkeley ilding incorporates general offices, complete parts de- artment, spacious well lighted shop, and a showroom, iking in appearance, that is visible for nearly half a ile in either direction. The service shop, covering an ea of approximately 4,000 quare feet, is outfitted with e latest tools and equipment. Everything necessary for nducting complete engine diagnosis and overhaul has en provided. For example, a Monorail equipped with o 2-ton electric hoists runs the length of the shop and ts down material handling time to a minimum. An igine test stand with air brake can be adjusted to the oper load for any G. M. Series 71 Diesel engine. ther important shop equipment includes a shop crane ith 2-ton hoist, 60 ton hydraulic press, paint spray uipment, complete welding apparatus and a small ist proof room for Diesel engine injector repairing. ll cleaning and testing operations are performed in a)′ x 50′ outside yard adjacent to the main shop area.

The West Coast Engine & Equipment Company em- oys an expert crew of factory trained mechanics who ve established an excellent reputation for service skill.

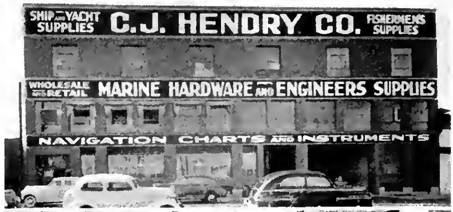
This young organization headed by Muirson C. Wright, mes R. Williams and Eugene C. Rhea has had a re- arkable record of development in the short time since formation. It was in July 1947 that these three former etroit Diesel Engine Division men with three em- oyees started operations in a small Oakland shop on ennison Street. In less than one year it has grown to organization of 25 people with full operating branches Fort Bragg and Eureka. In addition, the West Coast igine & Equipment Company has appointed G. M. iesel sales and service dealers at Monterey, Brauscomb, escent City, Santa Cruz and San Francisco.

Besides General Motors Diesel engines, the West ast Engine & Equipment Company are distributors r Nordberg marine gasoline engines.

op: Exterior view of West Coast Engine and Equipment Company. ottom: Partial view of West Coast Engine & Equipment Company's nodern repair ship which has facilities for complete engine diagnosis nd overhaul.

C. J. HENDRY COMPANY

John A. Logan, Manager, San Pedro Branch, C J Hendry Co.



Section of Fishing Department.

Top. Exterior view of C. J. Hendry Company on South Front St., San Pedro. The Company was established in San Pedro in 1915. Salesmen cover the area from Santa Barbara to Newport Beach, serving both commercial fishermen and the yachting trade. Branches of the company are located at the Fishermen's Cooperative Dock, Berth 73, San Pedro, and Terminal Island.

Center: Section of main floor. The area in the main building is 35,000 square feet.

Bottom: Part of display of navigation instruments for both commercial and pleasure craft.

Ralph E Grimes, Columbia Electric Mfg. Co.

COLUMBIA ELECTRIC IN ENLARGED PLANT

Conveniently located adjacent to The Embarcadero in San Francisco, Columbia Electric Manufacturing Company is now in its new and enlarged headquarters at 275 Steuart Street. George E. Fletcher and Ralph E. Grimes, co-partners in the firm which was established in 1926, are well-known for the manufacturing of panel boards, switchboards and generator control boards, and special control boards for power installations.

Prior to World War II Columbia Electric's work was mainly for large buildings, schools and industrial plants. During the war the company produced a vast number of units for the Navy and Maritime Commission in addition to carrying on its original work.

COMBUSTION NAMES C. H. JOHNSON MARINE MANAGER

Charles H. Johnson has recently been appointed Manager of the Marine Department of Combustion Engineering Company, New York.

A mechanical engineering graduate of Notre Dame, Johnson spent some years as an engineer officer in the U. S. Coast Guard, resigning in 1919 with the rank of Lieutenant Commander. He then became associated with U. S. Steel's Federal Shipyards as assistant to the chief engineer and in 1915 became chief engineer, which position he held until taking over his work with Combustion Engineering.

During the war he was granted leave to serve with the U. S. Maritime Commission as coordinator of engineering and as technical advisor to Vice Admiral Howard L. Vickery, vice chairman of the Commission. In this capacity he became widely known as an authority on propelling machinery.

◀ Charles H. Johnson

British Consul-General Honored

The picture below was taken recently at San Francisco's Bohemian Club at a luncheon given by Joseph A. Moore of the Moore Dry Dock Company in honor of British Consul-General Cyril H. Cane.

We show here equipment to grind threads of any pitch to precision limits — Maximum thread lengths — 8" on 14" work piece, maximum diameter 4¾".

Walter T. Wells, president and general mgr., Superweld Corp.

Superweld Corporation

Organization of Superweld Corp., to engage in the electric copper brazing of steel, localized heat silver brazing, bright annealing, and in the manufacture of specialized metal products, is announced from Glendale, Calif. Walter T. Wells, chairman of the board of directors, and one of the founders of Lane-Wells Company, has been elected president and general manager. Other officers elected include Robert E. Jones, formerly with the Ray Control Division, vice-president; and C. B. Lansdown, formerly assistant treasurer of Warner Manufacturing Company, secretary-treasurer. In addition to the above directors, Harold C. Hill of General Electric Company, Los Angeles, and William M. West of West & Co., specialists in builders hardware, are directors.

Superweld Corp. has purchased all furnaces and brazing equipment of Warner Welded Products, and leased the building with an area of 17,000 square feet and additional land for parking and loading facilities at 708 Hawthorne Street, Glendale.

In addition to performing a highly modern and efficient brazing and metal treating service for industry throughout California, Superweld will manufacture a line of revolutionary new products of its own design and will market them throughout the United States.

Frank White Retires

Frank G. White, Chief Engineer for the Board of State Harbor Commissioners, Port of San Francisco, retired on April 30th, after 37 years of service, announces Robt. H. Wylie, Port Manager.

Mr. White was appointed assistant engineer in 1911, and was elevated to his present position in 1916. During his 37 years of service he figured largely in the development of the modern port that exists today, and served as consulting engineer on various port projects and foundation problems in Vancouver, B. C., Portland, Oregon, Santa Barbara, Long Beach and San Diego, as well as in the San Francisco Bay Area.

Mr. White is past president of the American Association of Port Authorities; life member, American Society of Civil Engineers; past president, San Francisco Kiwanis Club.

Successful Voyagers

Below, left to right: E. Russell Lutz, Vice President of the American President Lines; George L. Crow, District Manager, Federal and Marine Division of the Apparatus Dept. in San Francisco; and Hughes Ogilvie, Engineering Representative for General Electric who went on the SS PRESIDENT CLEVELAND'S maiden voyage to the Orient.

500 JOBS OFFERED BY NAVY

All types of skilled mechanics, machinists, welders and riggers are needed for civil service jobs at Naval Net Facility on Saipan, Ralph L. Cornely, Mare Island employment representative, has announced.

Refinery mechanics and fuel gaugers are needed at Naval Fuel Farm and also on Saipan and jobs for ordnancemen are available at Naval Ammunition Depot, Guam. Professional and technical positions are also available for immediate placement in the Marianas.

Income tax exemption, six weeks paid vacation a year and excellent recreational facilities are features of jobs in the Marianas.

Applicants will be interviewed by Mr. Cornely at California Department of Employment offices on the following schedule: Every Monday at 121 23rd St., Richmond; every Tuesday at 1690 Mission St., San Francisco; every Wednesday at 13th and Madison Sts., Oakland; and alternate Thursdays at 49 East St. James St., San Jose, and 111 South Sutter St., Stockton.

PRESIDENT PERON OF ARGENTINA ABOARD THE ARGENTINA

President Peron of Argentina, accompanied by Emmet J. McCormack of New York, vice president of Moore-McCormack Lines, during the visit of the Good Neighbor liner ARGENTINA to Buenos Aires on her first postwar voyage to the East Coast of South America. This picture was taken when President Peron went aboard as a formal gesture of welcome to the American-flag ship that bears the name of his nation. Members of the President's staff (including Dr. Hortencio Quijano, vice president of Argentina, directly behind McCormack) are also seen in this picture. The ship also called at Rio de Janeiro and Santos, Brazil; at Montevideo, Uruguayan capital; and at port-of-Spain, Trinidad, in the British West Indies.

BILGE CLUB PRESIDENTS

PMR reporters stumbled into this shot of the entire group of past presidents of the Bilge Club at a luncheon meeting held at the Long Beach Athletic Club to draw up ballot for election of 1948-49 Board of Governors for the Bilge Club. Left to right: A. R. Bert Pegg, Marine Solvents Corp.; Lloyd Moore, General Petroleum; Albert O. Pegg, International Paint; Jack Malseed, Shell Oil; Dan Dobler, The Texas Co.; Walter C. Richards, Wilmington Iron; Harry Summers, Retired, Army; R. W. Duke Decker, San Pedro Tug; J. M. Joe Costello, J. M. Costello Co.; T. B. Forster, Forster Shipbuilding Co.; A. F. Boro, J. M. Costello Co.; T. W. Peters, Standard Oil; John Eidom, Hancock Oil.

PACIFIC TRANSPORT PURCHASE PROGRAM

Richard A. McLaren, president of Pacific Transport Lines, Inc., recently announced that his company has embarked on a long-range purchase program as a result of an extended survey in the Orient and of Company operations there.

First acquisition is the 10,800 ton *Colgate Victory* purchased from the Maritime Commission at a cost of $1,005,431. She will be renamed the *Hong Kong Transport,* and shortly be placed in the company's regular dry-cargo and refrigeration service between California, Philippines, China and Japan.

The new vessel is the Victory type, a war-designed ship which has proved successful in peacetime operation. She is of 10,800 deadweight tons, speed 17½ knots with turbine propulsion of 8500 horsepower. She was built by the Oregon Shipbuilding Corp. in 1945. Her new master will be Captain K. A. Shannon.

This is the fourth vessel purchased by the Line since its organization less than two years ago. The other three are modern C-3 type, 18-knot vessels of more than 13,000 deadweight. They are the *Pacific Transport, Philippine Transport* and *China Transport.*

The total program is scheduled to be completed this year. The company intends to own all its tonnage.

Headquarters of the Line in San Francisco are at 244 California Street. Company offices are located in Los Angeles, New York, Detroit, Chicago and Washington. Jardine, Matheson & Company, Ltd., represent the Line in China and Hong Kong. Everett Steamship Corp. are agents in the Philippines and Japan.

Richard A. McLaren, president, Pacific Transport Lines.

GLOBAL SHIPPING COMPANY FORMED

Announcement has been made of the establishment of the Global Shipping Company Inc., who have opened offices in the Balfour Building, 351 California Street, San Francisco. The purpose of the company is to engage in the movement of full cargoes in all directions.

Manager of the new firm is H. H. Pierson who is well known in shipping circles on the Pacific Coast.

HARTMAN NAMED GENERAL SALES MANAGER

E. George Hartmann

John A. Roebling's Sons Company, Trenton, N. J. manufacturers of wire rope and wire products, through E. C. Low, vice president in charge of sales, announces the appointment of E. George Hartman as general sales manager.

Hartman, who brings to his new position over twenty-nine years' experience in the wire field, has been associated with the Roebling Company since 1940.

Widely known in the industry, he is a member of the Wire Association and the American Iron and Steel Institute.

An officer aboard the ESSO PARKERSBURG studies the scope of a newly installed Sperry radar set.

Sperry and Radiomarine Radar To be Installed on Forty ESSO Tankers

Placing of contracts for radar sets, to be installed on 40 of its seagoing tankers, is announced by Standard Oil Company (New Jersey). The Company has completed arrangements for the purchase of 20 sets each from Radiomarine Corporation of America and Sperry Gyroscope Company, as the first step in its program to equip the 90 vessels of Esso's American and Panamanian flag fleets with radar.

The marine radar equipment to be installed under the present contracts utilizes new postwar designs which are especially prepared for commercial vessels, reports M. G. Gamble, general manager of Jersey's marine operations. The sets operate on a frequency band of 9320-9500 megacycles (3-centimeter wave length) and are fitted with 12-inch viewing screens. A Radiomarine radar set has been under test aboard the *Esso Paterson* and a Sperry set aboard the *Esso Parkersburg*. Radar instruments of other types and manufacture are operating on a trial basis aboard other tankers in the Esso fleet.

With the adoption of this new advance in navigational aids, Standard Oil Company (New Jersey) becomes the largest user of commercial marine radar in the world. The Company was also the first tanker operator to install gyro-compasses and radio direction finders throughout its fleet of deep water vessels.

Installation of radar sets will be made on the tankers while in port undergoing voyage repairs and it will take about a year to complete the program.

CROSSING THE HELLESPONT

Huge ropes 28 inches in circumference were used by Xerxes, the Persian general, to move his vast army across the Hellespont in 480 B. C., it is reported by the Columbian Rope Company's historian. The great ropes held together 674 merchant ships, moored in two rows, and supported a plank roadway that stretched from shore to shore, a distance of ⅞ of a mile. The giant ropes held the floating bridge in place for the seven days and nights required for the men, horses and chariots to cross the treacherous waters.

New Portable Power Units

A long-standing need of power utilities and industry using power for a compact, easily moved, short-notice source of emergency electric current may be filled within the next few years by mobile gas turbine plants now under development by Allis-Chalmers engineers.

Studies have already been made of 3000 and 6000 kw units to be mounted on railway trucks for rapid movement over normal railway track or comparatively irregular freight and utility yard tracks, Allis-Chalmers reports. The proposed units could operate as a sole source of power or could be synchronized with an existing power system.

Simplicity, extremely smooth operation and no requirement for water would characterize the gas turbine plants, according to Allis-Chalmers engineers. Operating on oil, the units would require only fuel line connections to tank cars or storage tanks, in addition to the electric transmission line connection.

The prime mover of the 3000 kw unit operates on the simple gas turbine cycle with regenerator. With an inlet temperature of 1300 F, the unit would have a fuel-bus efficiency of about 23 per cent at full load. Mounted on eight carrying axles arranged in four standard freight car trucks, the power plant would weigh approximately 230,000 pounds. Sufficient oil-tank space is built into the unit to permit full load operation for at least six hours.

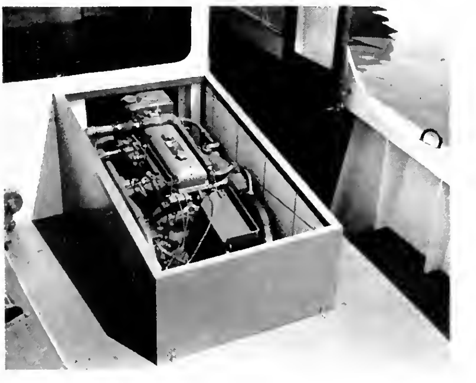
The turbine unit is coupled to a 3600 rpm generator through a reduction gear. All working air for the gas turbine plant and cooling air for the generator is taken in through filters in the side walls of the cab. All electrical equipment and synchronizing apparatus is built into the cab.

General arrangement of the more powerful 6000 kw, 3600 rpm unit is identical to the smaller power plant, except that the inlet temperature is 1150 F, and a gear will not be necessary. Efficiency will be approximately 21 per cent. Total weight would be about 500,000 pounds, with tanks loaded for eight hours operation and the unit ready for service. If a higher efficiency unit with limited life is desirable, the 6000 kw size gas turbine can be built for 1300 F gas inlet temperature, in which case the efficiency would be 23 per cent and the generator output would be increased to 7500 kw.

Standard draft gear and air brakes would permit these power plants to be moved in freight trains. The regenerator and the air exhaust stacks for generator and regenerator must be removed for standard clearance.

The mobile gas turbine plants appear to be a very promising source of extra power which can be made available within a few hours. Where regular power plants are out of operation when a disaster strikes, such units could be located on a rail siding from where they could very quickly deliver power into the existing system. Similarly, industrial plants faced with a sudden temporary need for extra power could put a mobile power plant into operation, to avoid the expense and time involved in construction of a powerhouse. It could also provide emergency service during service shutdowns or turbine failure.

The ready accessibility of the Diesel engine is well shown in this picture. Opposite picture, the water taxi.



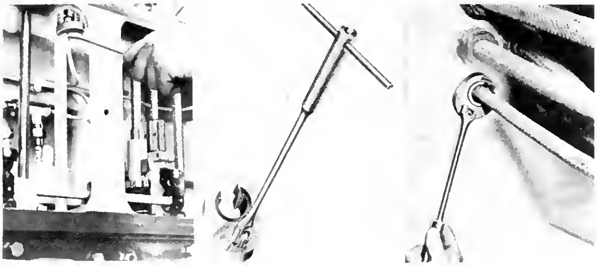
DIESEL POWERED WATER TAXI

A recent development and popular addition to the stock line of boats built by Equitable Equipment Company of New Orleans, La., is the GM Diesel powered "Water Taxi." Originally intended for use by several of the major oil companies in conducting off-shore drilling operations, the "Water Taxis" have attracted considerable favor in many other fields by virtue of their all around adaptability. They are now being employed as call boats, dredge tenders and work boats for transporting personnel or light freight to and from water site jobs. The tiny craft measure only 28′6″ in overall length and have a beam of 8′6″. Draft (loaded) is 2′4″. Although it has an outward resemblance to a pleasure craft, the "Water Taxi" was designed specifically as an industrial boat. This point has been emphasized by extremely rugged construction enabling the small ship to stand a lot of abuse. The hull and superstructure both are fabricated entirely of electrically welded steel. The two transverse bulkheads are of 10 gauge steel plating. Ten gauge material is also used for the shell and deck plating while 12 gauge is employed throughout in the cabin construction. The cabin top is glass insulated and sheathed with masonite, plywood, transite or aluminum. Windows are of the automotive type having aluminum frames set in rubber. Diamond tread aluminum floor plate is employed in the cockpit.

Propulsion power for the "Water Taxi" is supplied by a 100 HP 3-cylinder General Motors Series 71 Diesel engine equipped with a GM hydraulically actuated reverse gear. "Finger tip control" of the reverse mechanism makes the "Water Taxi" an easy and responsive craft to handle. The stainless steel shaft is direct driven from the GM Diesel engine and turns a bronze 3 blade propeller of 18″ diameter. Top speed with the engine running at 2000 RPM is approximately 15 MPH. Port and starboard fuel tanks have a capacity of 66 gallons each, enough for about 20 hours of top speed operation.

In addition to the 28 ft. model the Equitable Equipment Company produce a 34 ft. version of the "Water Taxi" which is also powered with a General Motors Diesel engine.

T·A·C Open-End Wrench



The new T.A.C. open-end ratchet wrench shown above is designed for use on pipe, tube, conduit, cable, and rod fittings where an ordinary ratchet cannot be used. The ratchet heads operate in a $7\frac{1}{2}°$ arc or less, which makes it ideal for restricted areas.

The T. A. C. tool was originally designed for shipboard use, and is standard equipment on all U. S. Naval vessels, but its time-saving qualities are making it indispensable in the aircraft, automotive, railroad, petroleum, electrical, and other industries. In the Douglas Aircraft plant alone, the T. A. C. wrench cut a tedious 3-hour job on the DC-6 to less than five minutes.

T. A. C. ratchet heads, sockets, and accessories may be bought separately or in sets in practically all sizes. An adapter also makes it possible to use standard sockets with the T. A. C. ratchet head.

Descriptive literature or information on dealerships and distributorships available from the C. J. Hendry Co., 27 Main Street, San Francisco.

Kidde Water Extinguisher

Kidde Water Extinguisher

Walter Kidde & Company, manufacturers of portable and built-in fire protection equipment, have received U. S. Coast Guard approval of their 2½-gallon water extinguisher. The portable unit weighs 42 pounds and is intended for use on Class A fires.

Davis Hardwood Company Moves

Davis Hardwood Company recently announced removal of the company's office, mill and yards to its own property at 757 Beach St., San Francisco. The company has two warehouse buildings designed for the operation of lift trucks. One two-story building of reinforced concrete construction houses the mill for the manufacture of hardwood plywood.

The company was established thirty-six years ago by the late William Davis, Sr.

Gerald H. Wagner Dies

The Pacific Northwest area manager for the Maritime Commission, Gerald H. Wagner died of a heart attack at his home in Seattle May 11. He was 54.

Wagner was prewar traffic manager for Mitsui & Company at Seattle for some years and went with the Seattle Port of Embarkation for the Army in 1941. He has been with the Maritime Commission in that area since 1942.

American Steel Warehouse Association

At the Annual Meeting of the California Chapter of the American Steel Warehouse Association, held April 2, the following 1947-48 officers were unanimously re-elected for the year 1948-49:

President, James D. Tayler, Tayler & Spotswood Co.; Vice Presidents, Paul Childs, Earle M. Jorgenson Co.; George W. Boole, A. M. Castle Co.; Secretary, Harry Levitt, Dunham-Carrigan & Hayden. Chapter Directors, Willis Kyle, Kyle & Co.; Hill Bain, Crucible Steel Co. National Director, James D. Tayler.

Southworth Appointed by Pedrick Piston Rings

Herbert L. Southworth has been appointed Pacific Coast representative for the marine and industrial division of Wilkening Manufacturing Company, makers of "Pedrick" piston rings. "Herb" Southworth's office is at 110 Market Street, San Francisco.

Sundfelt Expands

E. G. Sundfelt, president of Sundfelt Equipment Company, Inc., Seattle, announces that the company has moved to a new location at 220 Hudson Street, Seattle.

The recently completed facilities provide five acres of enclosed, paved plant space, with approximately 47,000 sq. ft. of warehouse facilities, 25,000 sq. ft. of shop facilities, and a modern 60′ x 75′ brick office building. A 750′ railroad spur into the plant yard and a 50-ton stiff leg derrick are also included in the firm's expanded facilities.

The Company handles both new and used machinery and equipment, specializing in marine, power, industrial and construction fields.

Change of Command at Kings Point

After two years as Superintendent, in Command of the United States Merchant Marine Academy, Kings Point, N. Y., Rear Admiral Richard R. McNulty relinquished his post to Rear Admiral Gordon McLintock on April 1.

Admiral McLintock becomes the fourth Superintendent of the Academy, his predecessors before Admiral McNulty being, Captain J. Harvey Tomb, USN (Ret'd.), and Rear Admiral Giles C. Stedman, now vice-president of the United States Lines.

Because of the torrential rain the outdoor ceremonies, planned for participation by the entire Regiment of Cadet-Midshipmen were canceled and the proceedings were broadcast to all hands over the Academy public address system. Admiral McNulty introduced the new Superintendent over the air, who read his orders directing him to take Command, at the conclusion of which, Admiral McNulty's flag was hauled down and the new Admiral's personal flag broken out.

The new Superintendent was then introduced to the administrative and academic officers of the Academy, drawn up in formation on the Quarterdeck in Wiley Hall.

Following the brief ceremonies, the Regiment of Cadet-Midshipmen, representing 44 States, Alaska, Porto Rico, Hawaii, the Philippines and the Canal Zone, resumed their daily routine.

Admiral McNulty left for Washington, where he will devote all of his attention to his duties as Assistant Chief of the Bureau of Training of the Maritime Commission and Supervisor of the U. S. Merchant Marine Cadet Corps.

Admiral McLintock, the new Superintendent, has had long experience in the Merchant Marine, including Command at the age of 24. He entered the Bureau of Marine Inspection of the Department of Commerce in 1930, in New York City, rising rapidly to Chief of the Examination Section in Washington in 1937, where he had charge of centralizing, standardizing and modernizing the examinations and experience requirements for Merchant Marine deck and engineer officers throughout the entire country. He became Chief of the Casualty Division of the Bureau in 1940, having cognizance over the investigation of marine casualties and collisions, and the trials of officers and seamen in the merchant marine. Entering the merchant marine training program of the Maritime Commission as a Naval Reserve Officer in 1942, McLintock remained in that activity, serving first as Chief Inspection Officer, then as Special Assistant to the Chief of the Bureau of Training, with the rank of Commodore. In 1941, Admiral McLintock represented the Department of Commerce in the Naval Inquiry into the burning of the *Normandie.* He represented the United States as delegate to the International Meeting in London on Aids to Navigation, in May, 1946, served in a similar capacity at the International Meeting on Radio Aids to Air Navigation in London in September, 1946; again was a delegate from the United States at the International Civil Aviation Organization at Montreal in October 1946; and at the International Meeting on Radio Aids to Marine Navigation at New York and New London in May 1947. He was one of the Maritime Commission's representatives at the International Labor Organization Conference at Seattle in June, 1946. He is also the Maritime Commission representative on the Executive Committee of the U. S. Radio Technical Committee for Marine Service, and is Chairman of the Merchant Marine Decorations and Medals Board. He is prominent in the development of the use of Radar on merchant ships and presently serves as President of the Institute of Navigation.

Admiral McNulty is the sixth generation of his family to follow the sea. He was born in Gloucester, Mass., and attended Gloucester High School, graduating from the Massachusetts Nautical School in 1919 and School of Foreign Service, Georgetown University in 1922.

McNulty, through more than 20 articles, which appeared in newspapers, shipping and naval periodicals during the period from 1925 to 1938, urging adequate education for merchant officers, was the pioneer of the federal program for the training of officers for the merchant marine and the naval reserve. He has headed the program since 1938. On April 1, 1946, he was awarded the Legion of Merit by the Secretary of the Navy for his outstanding services during the war. In 1940 he received the Naval Order from the President of Cuba for his assistance in the organization of the Cuban Naval and Merchant Marine Academy. Prior to his government service, Admiral McNulty was Fleet Operating Manager and Assistant to the President of C. D. Mallory Company and Mallory Transport Lines. In recognition of Admiral McNulty's achievements in the interests of the American Merchant Marine, the Georgetown School of Foreign Service has created the McNulty Scholarship, which is awarded annually to an outstanding graduate of the U. S. Merchant Marine Academy.

Kings Point Maritime Academy.

MARDEN AND HAGIST

Marden & Hagist personnel. Left to right: Arthur Hosfeldt, John Sipila, Kenneth Hagist, Dick Sindelar, Cliff Ingham, Ed McCormick.

Established five years ago by Kenneth N. Hagist and John V. Marden, Marden & Hagist is one of Portland's youngest ship chandler firms. The company carries a complete stock for ships in the Port of Portland in addition to a full line of small boat parts for commercial fishing and sport cruisers.

Schenley liquors, in Bond, are carried in stock by the firm. Located at 1705 N. W. Fourteenth Avenue are the main office and warehouse, heavy goods are carried in Warehouse No. 2 at 140 N. E. Broadway and chain and deck lashings are stored at Albina Terminals. An agent is maintained at Coos Bay, Oregon, and all ships are contacted at that port as well as at Portland.

Personnel of the company includes Kenneth N. Hagist, President, who has been in the ship chandlery and marine electric field in San Francisco and Portland for the past twenty years; Richard G. Sindelar, Vice President and Sales Manager who has handled marine cordage for ten years; Edward McCormick, Purchasing Agent and Office Manager, formerly with Comercial Iron Works; and the Sales Staff, consisting of Clifford Ingham, former Swan Island Material Man, John Sipila, commercial fishing tug boat pilot who was a pilot on a U. S. Army Transport tug, and Arthur Hosfeldt, former lieutenant in the Navy, a submarine and LCI commander in the South Pacific.

The following are the manufacturers represented and their items in stock: Pabco Marine Paints, Plomb Tools, Perkins Marine Hardware, A. Leschen and Son Wire Ropes, Greant Western Manila Ropes and Twines, Apco Life Saving Equipment, Ray-o-Vac, G. E. Lamps and Radios, General Pacific Fire Extinguishers, Darcoid Packings, U. S. Rubber Hose and Belting, Olympic Ranges, Wasmer Galv. Bolts and Nuts, Pheoll Brass Screws, McKinney and Sergent Hinges, International Chain, Thomas-Laughlin Co. Marine Forgings, Dirigo Compasses, Ampco Non-Sparking Tools, Primus Stoves.

Below. Left: Interior of showroom, Marden & Hagist. Right: Exterior view.

A Knot and a Mile Has to be Explained Every so Often.

Your automobile runs 35 miles an hour (under war-time speed limits)—if you have gas and tires. That kind of a mile is a *statute mile,* or land mile, equal to 5,280 feet.

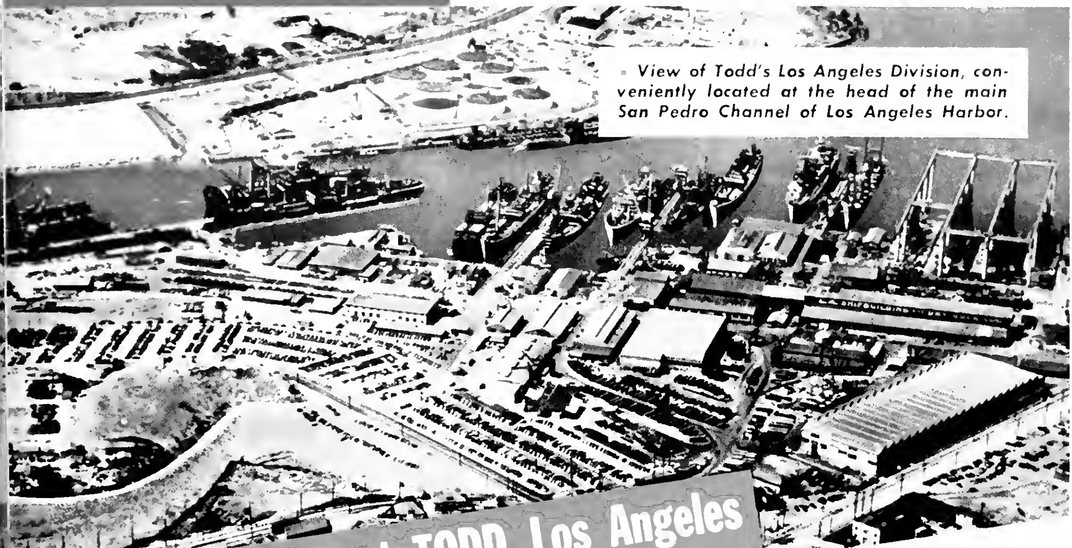
A ship's speed is expressed in *knots.* A knot is not a unit of distance; it is a unit of speed, equivalent loosely to one *nautical mile* per hour.

A *nautical mile* is equal to 6,080 feet, nearly one-sixth more than a statute mile.

When a ship's speed is 30 knots (a very high speed at sea) it means the ship is traveling 30 nautical miles per hour—or, roughly, 34½ land miles per hour.

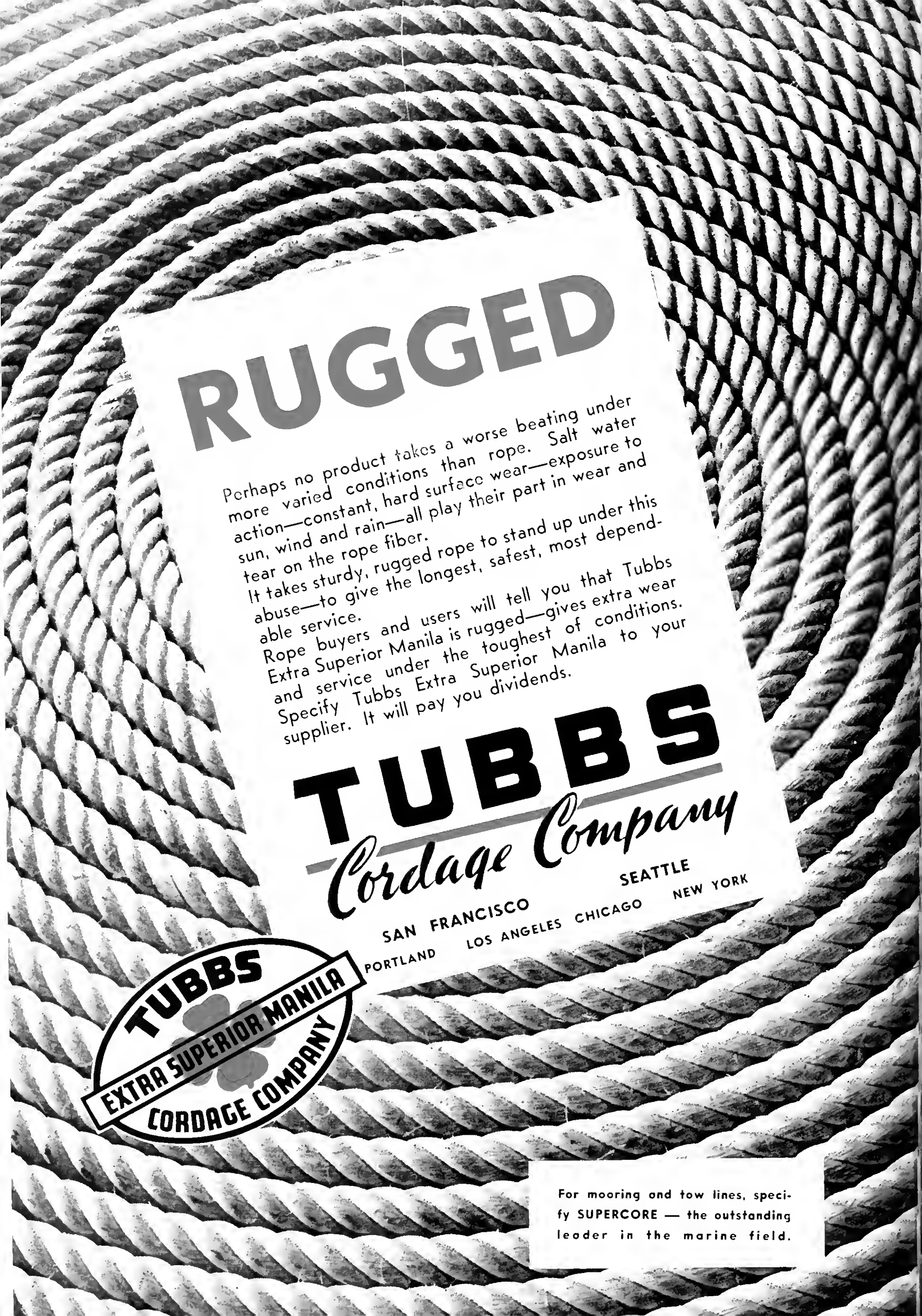
Pacific
MARINE
REVIEW

JULY 1948



• View of Todd's Los Angeles Division, conveniently located at the head of the main San Pedro Channel of Los Angeles Harbor.

• Weld inspection by Gamma-Ray Radiography—modern technique in use at Todd yards—records internal cracks or cavities on film.


RUGGED
Perhaps no product takes a worse beating under more varied conditions than rope. Salt water action—constant, hard surface wear—exposure to sun, wind and rain—all play their part in wear and tear on the rope fiber.
It takes sturdy, rugged rope to stand up under this abuse—to give the longest, safest, most dependable service.
Rope buyers and users will tell you that Tubbs Extra Superior Manila is rugged—gives extra wear and service under the toughest of conditions. Specify Tubbs Extra Superior Manila to your supplier. It will pay you dividends.
TUBBS
Cordage Company
SAN FRANCISCO
SEATTLE
PORTLAND
LOS ANGELES
CHICAGO
NEW YORK
TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY
For mooring and tow lines, specify SUPERCORE — the outstanding leader in the marine field.

Pacific MARINE REVIEW

J. S. HINES
Publisher

B. N. DeROCHIE
Assistant Publisher

T. DOUGLAS MacMULLEN
Editor

B. N. DeROCHIE, Jr.
Assistant Manager

PAUL FAULKNER
Pacific Coast Advertising Mgr.

DAVID J. DeROCHIE
Assistant Los Angeles

GEORGE W. FREIBERGER
Advertising Mgr. San Francisco

LOS ANGELES OFFICE
43 Wilshire Blvd., Beverly Hills
elephone—BRadshaw 2-6205

SAN FRANCISCO
Telephone—GArfield 1-4760

MEMBER AUDIT BUREAU OF CIRCULATIONS

ubscription rates:

ne year, $2.00; two years, .50; three years, $5.00; for- gn, $1.00 additional per year; gle copies, 25c.

TABLE OF CONTENTS - - - - - - - JULY, 1948

PUBLISHED AT 500 SANSOME STREET • SAN FRANCISCO 11, CALIFORNIA

This Rope Gets Its Start In Columbian's Philippine Bodegas . . .

Loose bales of Manila fibre from the provinces are being received at the Columbian Rope Bodega (grading and packaging plant) in the Philippines

Columbian Field Force Assures Best Manila Fibre For COLUMBIAN ROPE

From fibre-producing plantations now gradually being restored in the Philippine Islands, comes the selected manila fibre that goes into Columbian Tape-Marked Pure Manila Rope.

Columbian representatives, constantly in touch with the better plantations, contract for the raw fibre before it is ready to pack or bale — to make sure of getting the best quality. The selected manila fibre, tied in bultos for easy handling, is transported to Columbian's warehouses, or bodegas, where it is graded and baled for shipment to our mill.

Entirely rebuilt since the war's devastation, Columbian warehouses and other facilities are completely modern, strategically located, and managed by experts in judging and buying fibre. Columbian maintains this on-the-scene service to guarantee the best in manila fibre supply. You benefit from this far-reaching program, get better, more dependable rope when you select COLUMBIAN — The Rope of the Nation.

COLUMBIAN ROPE COMPANY

400-90 Genesee St., Auburn, "The Cordage City," N. Y.

There is no finer rope!

Pacific MARINE REVIEW

FIFTY-FIFTY

WHEN CONGRESS APPROVED the European Recovery Program, the American shipping industry and American industry in general won two signal victories. One was the refusal to pass the State Department's plan to give or lend five hundred of our ships to beneficiary nations, and the other was the provision that fifty percent of cargo be transported in American ships There is a catch in this 50-50 deal, however, and it brings into focus again the disadvantage which our shipping constantly faces. It is a disadvantage under which no vital industry should be forced to labor.

It is true that each of many industries seems most vital in a national emergency. Usually it is the industry with which we as individuals are most concerned It may be shipping, or steel, or oil, or food Let us say that *all* are vital. All *are* vital, and all need protection. There should be no obstacles placed arbitrarily in the way of such industries by competitive industries with selfish motives, but when there *are* such obstacles the people as a whole should work to overcome them.

The joker in the 50 percent provision is in the requirement that the rates must be "market" rates. If American rates are above the "market," the protection of the law is lost. It would be unfortunate indeed if sluggish methods of the government, past and present, were to contribute to an avoidance of the intent of Congress.

Happily, the recently appointed Director of Transportation for the ECA, Arthur G. Syran, is the type of official who will make 50-50 mean FIFTY-FIFTY if it can be done, and American ships, insurance companies, banks and labor will get the fair division to which they are entitled Mr. Syran has just returned from Japan where as Chief of the Water Division in General MacArthur's headquarters, he conducted a survey of Japanese shipping facilities. As an Army colonel during the war he was Chief of Ocean Traffic for the War Department, and has been executive assistant to the president of the National Federation of American Shipping, and had previously been special assistant to the chairman of the Maritime Commission Final details for the flag division of shipping have not been worked out, but the general plan is reported to be control of the funds country by country, and to shut off the money wherever the law is flouted. The American shipping industry has its part to play. So has the Maritime Commission, the Army, the Treasury, and various others.

As the cargo volume grows, the industry may get a break the like of which it has not been getting in Canal tolls, or in ship sales, or in subsidies, or in depreciation rates, or in rail and air competition. It has had and will always have many problems, which recalls to mind the apt admonition of a Stanford professor that we "store up a great stock of enthusiasms, for we will lose many of them along the way and may reach the end of life with an empty heart."

(A later progress report on cargo distribution will be found in "Flashes," page 80 of this issue.)

Army Transport Service and Shipping

Conversion of the Transports "Shanks" and "Ainsworth"

Recutting Teeth on Main Gears

Installation of Folding Hatch Covers

IN A TALK given May 27 by Colonel W. W. Moore of the Office of the Chief of Transportation, Department of the Army, before the Society of Naval Architects and Marine Engineers at Old Point Comfort, Virginia, he traced the vital relationship that exists between the Merchant Marine and the Army Transport Service.

There have been many complete conversions of transports from wartime to peacetime service, and the work just performed on the *David C. Shanks* and the *Fred C. Ainsworth* at the San Francisco Yard of Bethlehem typifies the effort of the Army to coordinate its vessels with merchant shipping and the support of private shipyards. These two vessels were given the "safety conversion" treatment required by Coast Guard regulations, and in the course of the work certain outstanding features were brought to notice which will interest the industry as a whole. But first let us quote at length from Col. Moore's remarks so there will be full appreciation of the part the Army takes in shipping matters. He says:

Any action taken with regard to the strengthening of the Merchant Marine is of vital interest to the Army since the size of the forces which can be deployed and maintained overseas in advancing the security needs of this nation, either in peace or in war, is dependent upon the ability of the Merchant Marine to supply the shipping required. Defense of this country can best be conducted beyond the American Continental limits, and the initiative must be retained by the United States once the conflict has begun. The maintenance of an Army fleet capable of launching and supporting an expeditionary force of the size required for defense of this nation would be extremely costly and wasteful, and therefore reliance must be placed on the maintenance of an adequate merchant fleet under the U. S. flag capable of expansion to meet the overwhelming needs of war. Fifty-four million deadweight tons of ships were built under the direction of the Maritime Commission—to say nothing of the Navy's gigantic construction program and the Army's construction program of approximately 20,000 miscellaneous vessels, plus a large ship conversion program. By the end of the war, merchant shipping under the control of the united nations had grown to an aggregate of 90,000,000 dead weight tons. Yet at no time during the war was there a surplus of shipping. Rather, there was a constant demand for more. I cannot leave this subject without a brief remark about reefer ships as I have strong personal feelings in the matter. I think we fell far short in providing sufficient ships to meet our requirements.

We received only eight tenths of one cubic foot of reefer cargo per man per month during the entire campaign period. We figured a minimum of two and one-half cubic feet per man, and three cubic feet per man as being desirable. In view of this, I recommend that we commence providing reefer ships along with other ships at the beginning.

The fact must not be overlooked that in order to offset our lack of shipping at the beginning of World War II, we were obliged to divert to the building of ships tremendous quantities of critical material, notably steel, which might otherwise have been utilized for other scarce war equipment. Except for the necessity of building as many ships as possible, we could have produced the needed tanks, guns, and other combat equipment more rapidly.

While the Department of the Army expects to maintain a small fleet of vessels for specialized services incident to the support of forces which will be manning the outlying bases of the Army, it is the present policy to utilize the merchant fleet of the United States to a marked extent for transporting Army cargoes. Present

The FRED C. AINSWORTH on trial run on San Francisco Bay.

Army plans call for the transport of 75 per cent of such cargo by commercial vessels. This policy of the Department of the Army was established in order to assist in fostering a healthy merchant fleet under our flag that will be capable of the rapid expansion that will be required in the event of another war. The small fleet that the Department of the Army plans to maintain will be utilized in supplying those areas which are not normally served by the commercial fleet of our country, and it will be entirely inadequate for the support of mobilization of the Army should such action become necessary.

Colonel Fenton S. Jacobs, Port Commander, announces the following distribution of Army sponsored dry cargo moving to the Orient through the San Francisco Port of Embarkation on dry cargo ships for the seven months period ending June 30, 1948: (in stowed tons)

American President Lines	149,878 tons
Pacific Far East Lines	149,350 tons
States S S Co.	148,301 tons
Pacific Transport Lines	143,229 tons
Sudden & Christensen	139,193 tons
American-Hawaiian S S Co.	20,840 tons
Total	750,791 tons

Colonel Jacobs said that in order to provide an equitable and impartial distribution of all cargo, a Cargo Allocation Committee was set up in December 1947 to assure all concerned of a rigid, fair and equitable distribution of dry cargo, limited only by the ability of the individual steamship operator to offer space to the Army.

The Army of today is a global Army and Shipping is the major requirement for its support. To support the planned overseas forces of the Army during the period in which we have occupational forces in Germany and Japan, it has been estimated that 247 vessels will be required. The planned overseas garrisons of the Army during the post-occupation period, after the withdrawal of the occupation forces, will require the employment of 153 vessels. For instance, during the occupation period, it is estimated that 990,000 troops and their dependents will be moved yearly to and from overseas areas and 3,645,000 measurement tons of military dry cargo will have to be lifted annually to support this force.

It will be necessary for the Army to maintain and operate certain vessels for specialized services. The Army maintains bases in out of the way places that are not normally served by the commercial shipping lines of the United States and it is necessary to transport personnel and supplies to these bases. In the Pacific Ocean Area

(Continued on page 75)

Conversion of the Transports "Shanks" and "Ainsworth"

Nearing completion of an extensive conversion in the San Francisco yards of the Bethlehem Steel Corp., the Army Transport *Fred C. Ainsworth*, sister ship of the U.S.A.T. *David C. Shanks*, will shortly rejoin the Army's Fleet of Transports carrying Officers, Troops, Army Dependents, and Army Cargoes between the Pacific Coast and the Orient.

These two vessels, which were built by Ingalls Shipbuilding Corp. at Pascagoula, Miss. in 1942 for the Maritime Commission, were converted by builders to troop transports and delivered to U.S. Army Transportation Corps.

The *Fred C. Ainsworth,* built as *S.S. Pass Christan,* M. C. Hull No. 166, was launched Nov. 20, '42, and given her Maritime Commission sea trial May 31, 1943, before her ultimate delivery to the Army. This vessel, the nineteenth ship built and delivered by the Ingalls Corp., was originally contracted for as a single screw, geared turbine propelled, shelter deck cargo vessel of 7,900 gross tons. A change in the construction contract reassigned the hull to the United States Lines as a passenger and cargo ship. While still under construction, a further revision was made in the contract, whereby the vessel was converted for use as an Army Troop Ship.

For the past ten months the vessel has been undergoing an extensive conversion in the Bethlehem yards. All recently promulgated rules of the U.S. Coast Guard relating to fireproof construction, fittings, furniture, etc., and life saving equipment were complied with, which in itself was a very extensive and all-inclusive project. In addition, all interior arrangements, furnishings, fittings, accommodations, etc., were entirely altered and rearranged to provide more comfortable and livable quarters for all passengers and crew. The accommodations were altered so as to provide more cabin class space for military dependents, officer personnel etc., and the troop areas rearranged so as to reduce the number of troops carried with more comfortable accommodations than obtained during the capacity-loading period of national emergency.

In line with the U. S. C. Guard fire control requirements and other regulations, many existing bulkheads were sheathed and insulated with incombustible material (Marinite), and most of the bare steel decks were insulated with a magnesite type of deck covering, many of which were then covered with rubber tile and sheet rubber, resulting in a sanitary, long-lived, finished deck of pleasing appearance. Many additional rooms were constructed also using incombustible asbestos and mineral-fill joiner bulkhead panels, Aetna hollow-metal doors, trim, etc. Additional stair wells were constructed to improve access to and from the interior of the vessel, both in normal operation and at time of any possible emergency.

The construction of additional rooms, and the modernization of existing rooms, required the procurement and installation of quite a considerable amount of new Arnot metal furniture, which, with the bulkheads, deck covering, painting, etc., resulted in clean, comfortable staterooms of a cool, pleasing appearance, neat but not gaudy.

The hospital area was entirely rearranged and refitted, providing most of the facilities of a shore-based hospital unit, and including facilities for the care of infants and small children not provided for in the original war emergency lay-out.

Additional public rooms and provisions for recreation were incorporated in the design, both in cabin-class and troop class areas. The dining saloon was refitted, and enlarged so as to provide for the increased number of cabin class passengers, and the galley, pantry and baking areas rearranged as necessary.

Additional life boats and gravity davits were installed, and existing installations overhauled so as to comply with requirements for passenger certificates.

The heating and ventilating systems on board were entirely redesigned and rearranged, with many additional fans, ducts, heaters, etc., installed, so as to provide an over-abundance of air in tropical service, or adequate heating facilities in sub-arctic waters. The complete insulation of all exposed decks, outside bulkheads, and shell plating assists materially in the control of extreme temperatures in living and working areas.

Approximately 200 air-ports were installed in the shell plating, giving light, view and air to all areas below decks, formerly without these benefits. Crank-operated marine type windows were installed in the public lounge, smoking room, and enclosed promenade. The boat deck was covered with Douglas Fir decking with teak margin planks, using perhaps the first teak into San Francisco out of Burma since the war. This provides a comfortable and neat appearing walking surface for the daily constitutional walk of cabin class passengers, particularly appreciated by the women and children on board.

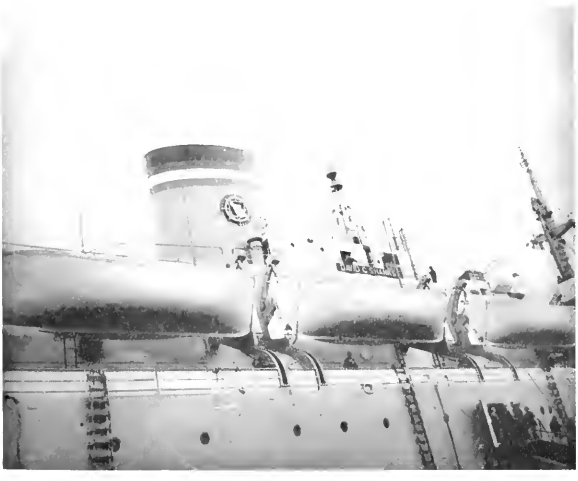
All cargo gear, winches, etc., were overhauled, placed in good working order, and tested. In addition, topping-lift winches were installed on all eight cargo booms to simplify and modernize the handling of this equipment.

In addition to the installation of new firescreen doors,

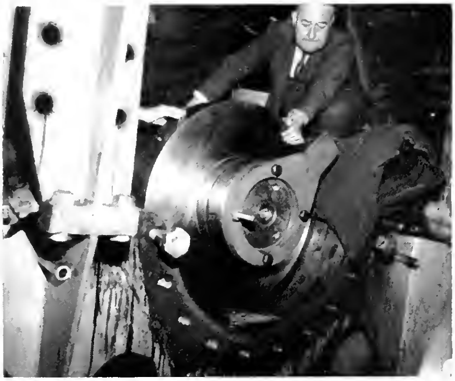
New streamlined aluminum stack built by Bethlehem being lowered into place on the SHANKS.

Top: Section of large passenger stateroom.
Bottom: Section of main lounge.

View of new stack in position.



Section of typical stateroom. Johns-Manville sheathing in ceiling and walls. All accommodations are similar on SHANKS and AINSWORTH.



Marshall Garlinger shoving the machinery around in the AINSWORTH. The machinery might as well give up.

and the installation of automatic-release magnets and hose passing ports in existing fire-screen doors, class 2 sliding water-tight doors were installed to replace the existing hinged water-tight doors which were not legal for use on "E" Deck. Remote control power operating equipment was installed on the two existing class 2 W. T. doors within the machinery space.

Extensive repairs were made to propulsion and auxiliary machinery, including the re-cutting of teeth on the main bull gears, and installation of new low speed pinions. The removal of the main gear is shown in the series of pictures.

All piping systems and plumbing fixture installations were altered and repaired.

A fresh-water chlorinating system was installed.

Wooden hatch covers were replaced with approved metal type, and the Alvin Campbell folding hinged covers were installed in 'tween-deck hatches.

Repair or replacement of all name plates, railings, garbage chutes, galley and pantry equipment, and portable fire extinguishing equipment was completed, as was also the repair, extension, and alteration of entire electric light and power systems, ship's telephone system, general alarm system, ship's public address system and nurses' call system in hospital.

With her new aluminum stack casing, replacing her former 8 ft. diam. "midgetstack" (and which, incidentally greatly aid in the removal of overheated air from the machinery spaces,) and with the removal of many emergency structures and fittings from her decks, the newly painted vessel presents a very pleasing appearance. The end result is comfortable and commodious passenger ships, but they are definitely not to be described as luxurious. For the service in which they will operate, they are well planned and complete.

Cantilever Hatch Covers On the "Shanks" and "Ainsworth"

It is a known fact that the economics of ship operation is strongly affected by its cargo-handling features, such as hatch openings, hatch covers, side ports, booms, rigging gear and winches.

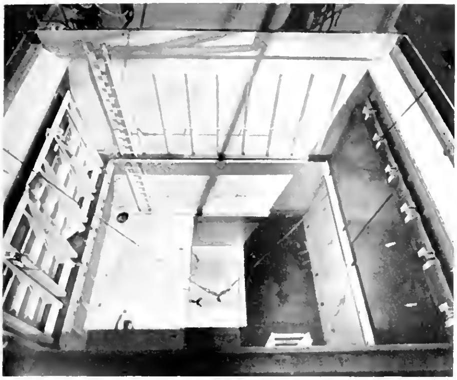
Profit earning is the function of a ship; in reference to a cargo carrying ship, its revenue earning capacity is determined primarily by the tons carried per year, capital charges, and the cargo-handling costs. Tons carried per year are influenced by port time and sea time. Reduction of port time increases the number of voyages and therefore the number of tons carried.

Ship operators, ship-builders, naval architects, and marine engineers are aware of the principles of ship's economics, but for a substantially long time there has been a lack of initiative in deciding a momentous revision in the design of the ship's cargo features, particularly in the type of hatch covers.

The "Campbell Cantilever Hatch Cover" is a unique simplified design of an all steel folding cover, as illustrated by the photographs. It was developed and patented by an industrial manufacturer acquainted with mechanical handling problems—both on ship and ashore.

It has been a laborious disadvantage to handle the numerous hatch board covers as well as strong-backs and tarpaulins. In trunked hatches where there is no 'tween deck storage space the hatch boards and strong-back problem is still worse. Where two or three deck heights are involved it is quite a problem and more so when there is existing weather deck stowage.

The "Campbell Covers" have recently been successfully installed on the Army transports *Shanks* and *Ainsworth*, while undergoing conversion at Bethlehem's San Francisco yard, in No. 5 trunked hatches on 2nd and 3rd decks. The design load as approved by the American Bureau of Shipping was 400 lbs. per sq. foot. They are equipped with a mechanical locking device which can only be released when the cover folds open above the horizontal. The latching device is spring-loaded and is made of cast manganese steel, over-designed to assure a high factor of safety.



View looking down No. 5 hatch with covers at 2nd deck in stowed position, and covers on 3rd deck partly closed.

Since the hatch as mentioned was trunked, eye-brows and a 16" over-hang were constructed on the out-board sides of the ship to accommodate the flush-type hinges and to protect the cover from lowering cargo while in their stowed position. On the fore and aft sides of the trunked hatch a 6" walking ledge was installed, which also acted as a bearing point along one edge of the cover.

Clear openings of the hatches were 21' 2½"x17', two half covers cover the opening, hinging to the out-board. These double hinge sections jack-knife to the port while two single sections hinged to the star-board.

The master hinges of each cover are two 3" C.R.S. pins while the double cover has 3 1¼" alloy pins. The center sections of the cover when closed fit as a box plug bearing on its bevel surfaces, thus transmitting little load to the hinges.

In the official load test of the covers, under witness of the American Bureau, a single hinge section 7' 6" x 7' supported as a cantilever a distributed load of 14 tons.

The cover, though designed and installed for a load of 400 lbs. per sq. foot, may be designed for a greater load per sq. footage if so required. The top plate is ¼" M.S. with a 3" flange on the fore and aft sides. Six 5/16" plates 15" x 9" deep tapered with 4" flange constitutes the main load members, with additional flat bar transverse to girders to resist buckling and give added stiffening. All members were continuously welded for 10" at their ends and intermittently welded between ends. Welding requirements were in accordance with A.B.S. specifications for all welded decks.

The double section cover has two flush type 1" diameter welded lifting pads—so positioned as to facilitate their folding while lifted by the cargo hook. The two complete half covers when in the closed position do not come in any bearing contact with one another—thus allowing either half section to be opened as desired.

The operation of the "Campbell Cover" requires no mechanical device other than the conventional buttoning cargo gear with the standard hook. The maximum load

View taken from lower hold looking up into the trunked area while single section covers are being raised from closed to open position.


View of single section illustrating girder structure and automatic latching device for securing covers when in stowed position.

required to be lifted at any time is approximately 1000 lbs.

During the operation test of these covers two deck levels were opened in less than two minutes time, with one man at the winch control and one on the hatch cover fastening the bridle. Life lines were installed on the fore and aft sides to allow for transverse passage and 15" manholes located at the aft starboard side of each deck to allow passage between the deck levels. Simultaneously with the operational tests on these new covers in No. 5 hatch, No. 4 hatch of similar design and size, but equipped with conventional strong-backs and metal hatch boards, required the services of six ship-yard riggers for the total time of 40 minutes to remove only two strong-backs.

These covers are suitable both for 'tween deck hatches and lower hatches of ships, trunked or otherwise. A similar cover of this design was previously installed and successfully operated for six years on the *S.S. Dakotan,* formerly of the American-Hawaiian S.S. Co.

The advantages of the Campbell type hatch cover as analyzed by ship operators and naval architects who have assisted in the design are:

1. Time saved in opening and closing hatches. Estimated time 2 minutes.
2. Fire proof.
3. Safer for longshoremen and ship's crew.
4. Allows full deck space for deck cargo and such. The problem of stowing hatch covers and strong-backs is completely eliminated.
5. Allows sectionized openings of the hatch for working cargo, and for ventilating the cargo space.
6. Requires less maintenance expense, although the capital cost is slightly higher, the maintenance over a long period of time is less.
7. Allows greater cargo space for storage because the girder designs are not as deep as the strong-back.
8. There is less pilferage of cargo. A padlock device can be installed to secure total hatch.
9. Lower insurance rates should be secured by reason of better accident records.
10. No additional equipment required to operate covers. Can be operated by the standard burtoning cargo gear.

THE BIG TANKERS

During the past several months we have published articles and drawings of the new giant tankers now under contract in various U. S. yards. A fine model of the 628 foot 26,000 ton vessel has been turned out by Van Ryper of Vineyard Haven, Massachusetts, and a photo of the model is shown below.

The Bull Gear Removed for Tooth Cutting on "Ainsworth"

Top, across page:

Looking far down at bull gear as it is about to be lifted out of its bearings to be shipped to General Electric's Lynn (Mass.) factory for removal of 1 1000 inch from the teeth.

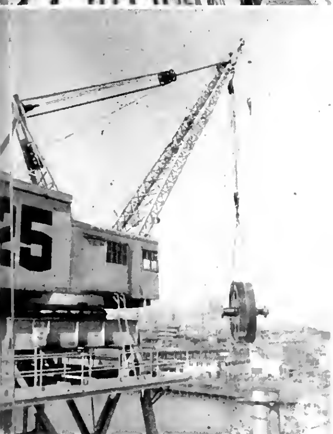
Nearing deck level.

Clear of hatch.

Left and right:

Showing other stages of progress of the gear out of the ship at Bethlehem's San Francisco yard.

Below: At General Electric's Lynn River works, 8500 HP low speed gear placed on wellcar ready for boxing and shipment for reinstallation in the AINSWORTH. This gear is 13 ft. 7 in. in diameter.



Panama Canal Tolls

By M. J. RYAN*
Naval Architect

M. J. Ryan

I DESIRE TO EXPRESS my views in connection with the report of proposed increase in the rate of tolls for transit vessels through the Panama Canal. As the President is charged with the responsibility of determining the rate of tolls within statutory limits up to a maximum of $1, it is his responsibility to fix this rate at a figure which will result in no extra burden in tolls levied on any American vessel, and will result in no further increase which has not already been defined by statute. It also leaves a minimum of latitude for administrative interpretation and application.

American shipping interests maintain that for many years the Canal traffic revenues have greatly exceeded the amount which would represent a fair and just return on the investment which the Government has made in the Canal as a commercial enterprise. No increase in tolls can be justified at this time, but on the contrary a material reduction in tolls should be made! In this connection it is desired to register an emphatic protest against the increase in the Canal transit revenue for commercial shipping as it has accepted and borne the entire net overhead of the cost of Canal Zone Government, administration, sanitation, etc. while the Panama Railroad Company, operating in unfair competition with commercial shipping is relieved therefrom. The commercial operators are also expected to bear the cost of the free transit of the U. S. Naval vessels, which has resulted in a loss of tolls ever since the Canal was open for business. According to the records the tolls forgiven on the Government ships to the end of the fiscal year 1947 amounted to 61.5 million.

The records of the Maritime Commission show that in the five year period from 1935-39 the intercoastal steamship operators suffered an aggregate loss of four million dollars as compared with their payments of about twenty-five million dollars in Canal tolls!

Referring to the segregation of Canal costs, as between commercial and military, and the fact of subdividing operating expenses along the same lines, the military and naval establishments as now maintained at the Panama Canal should be entirely divorced from the maintenance costs of the Panama Canal operations as a whole, and the construction costs of these military items should be borne from year to year by definite appropriations from the War and Navy Departments. These military items should never be included as part of the Canal expenses. There is no more reason why American shipping should have to bear the cost of transporting military supplies through the Canal free than that American transcontinental railways should be required to carry the costs of transporting military supplies across the country free!

The report of the special committee appointed by the President of the United States on the Panama Canel tolls and vessel measurement rules which were promulgated in 1937 and adopted by Congress, after the enactment of legislation at that date, amended the existing law and provided an increase in the tolls.

I point out that since the adoption of the new Panama Canal measurement rules and the new Panama Canal toll rates adopted by Congress in 1937, there has been no material increase in the volume of shipping using the Canal. If the present tolls were lower, traffic might be stimulated to the point where there would be a net increase in the traffic revenue, with results beneficial both to the economic welfare of the nation and to the American Merchant Marine as an element of national defense.

Just to give an example—during the years 1931-36 inclusive, the Grace Line had paid a total sum of $4,537,739 during this six year period. The Panama Pacific Line during the same period paid $4,135,400 and the Dollar Line paid $3,744,496. Most of this transit revenue has been lost to the Canal since the change in the rate of tolls in 1937 and the abandoning of the combination Intercoastal Passenger and Cargo vessels on this run.

Ever since 1914 the officials of the Panama Canal have

*M. J. Ryan was Technical Advisor to the American Steamship Owners Assn. on the Pacific Coast on Measurement Rules and Tolls during 1936-7. He is one of the country's leading naval architects and is considered an expert on intercoastal shipping.

›roposed to Congress a re-legislation of the Act, and so o make the Panama Canal rules of measurement the sole ›asis for toll charges, and would remove the present statıtory limits on the rate of tolls. In making this recomnendation the Canal authorities have uniformily stated hat the purpose was to simplify administration and renove inequities which they feel were inherent in the so alled dual system of measurements. It would appear that o a large extent they have *actually* been motivated by a 'esire to increase traffic revenue, and that they have not ›een fully appreciative of all the possible consequences f their proposals.

Since the 2nd World War American shipping has gone ırough a very difficult period, marked by enactment of ›gislation providing for control of practices and regulaons of rates by various Government bureaus, and also y frequent changes in Government policies with con'nual industrial disturbances and Conference difficul,es. These conditions have seriously jeopardized the inesrment in United States tonnage and have served to 'eate a lack of stability in the trade, particularly in the ıtercoastal trade, making replacement programs difficult -if not impossible.

American shipowners have emphasized the advantages ıat accrue to foreign owners and their freedom from ›ntinual changes in the laws affecting shipping. Only ırring the last few months have several Intercoastal ›erators begun to establish permanent service in this ade. Many months have been spent in the discussion of tes and conditions before some stability has been reach1. Any further change in the rate of tolls will affect these dividual lines.

Some of the intercoastal steamship lines operating rough the Panama Canal have paid over a million dolrs in tolls yearly and these tolls have approximated ound 10 per cent of their operating costs.

Many of the present Intercoastal operators are operatg at a loss. There is no margin of profit as compared th carriers on the other trade routes. Any increase in the lls by an increase in the effective rate will necessarily ›p or divert some lines which now use the Canal— sulting in a net loss of revenue, as well as serious inry to the American shipping interests.

Canal charges do not even stop with the tolls. Other iscellaneous charges such as transit pilotage is charged th on entering and leaving the Panama Canal, and also arges for the handling of lines, and offshore pilotage, c.

Lumber Trade

Intercoastal movement of lumber by vessels is the only lge outlet of the industry for low grade lumber items i the Eastern states. Under competitive conditions the lw market value of these items ordinarily precludes tir shipment to the Atlantic by rail. Intercoastal movent to the Atlantic seaboard is the best of all West Cast outlets for low grade common items. The West Cast lumber men must compete with similar items pduced by manufacturers of local and native soft woods whin short distances of identical eastern markets. Vast qantities of lumber items are trucked directly from swmills in the eastern and nearby southern states to cstruction projects in the large Atlantic Coast consming districts. The basic fact that should be recognized by the Government in the determining of reasonable Canal tolls the traffic will bear is that the lumber movement is one of tremendous volume, with the low value commitment. Lumber is not silk, or canned fruit. It can be maintained only by treating it as a bulk commodity with low commercial value, moving at a low rate. Low transportation costs through the Canal would obviously be of great concern to the West Coast lumber industry. Competition is particularly extreme from Canadian lumber or similar products, by reason of the availability of foreign tonnage for Canadian shipments. For the above reasons it would appear that the public policy could not impose further costs upon the intercoastal movement of lumber from the Pacific Northwest. For the same reasons the shipment of cotton from the East Coast to the Orient imposes an extra toll burden on the shipment of this commodity.

Open Shelter Deck Vessels

In the practical operation of vessels, tolls are imposed and paid for in open shelter deck spaces. These spaces do not compensate for the amount of vacant space on which tolls are paid. The average open shelter deck space in the most modern type of ships built would be approximately 131,000 cu. ft., and the average amount of vacant space per trip on this type of ship from 1930 to 1935 inclusive would amount to 110,000 cu. ft., which is equivalent to 1100 Panamian tons, which is collected for in tolls under the new system adopted by Congress in 1937. The theory of tolls on a vessel's earning capacity at 100 cu.ft. per ton, without credit for vacant space constitutes an inequity.

This places this type of ship, which is the most modern type afloat, at a competitive disadvantage against the open well deck ship, and sets up a discrimination when in competition with the other cariers. Any change in the redistribution of the toll burden as regards shelter deck vessels will impose heavy penalties on this type of vessel due to increase in the tolls. Vacant shelter deck spaces do not contribute to the vessel's earning capacity.

Those who are responsible for conducting our shipping business have necessarily opposed any change which would jeopardise the intercoastal investments concerned, especially when the proposed rate of tolls is imposed, indicating an unjustified increase in tolls.

Operating expenses have increased enormously and much greater than the shipowners have ever had before, and as most of these operators in this trade are without Government aid—may we trust that the foregoing will have the earnest consideration of Congress. We cannot too strongly urge it to avoid any increase in the rate of tolls if the President is serious in his desire to remove any undue burden or inequity between vessels engaged in the Panama Canal trade.

American people built the Panama Canal with their own money and genius and when we abandon our historic policy of free commercial intercourse between the states concerning American vessels operating between Pacific, Gulf and Atlantic ports, we set up a toll gate in our Intercoastal trade and thereby increase the amount the transcontinental railways may charge for rendering the same service on land.

Aluminum—

In the President Cleveland and the President Wilson

THE NEW STEAMSHIPS *President Cleveland* and *President Wilson* of the American President Lines are P2-SE2-R3 type vessels. They were designed by the Maritime Commission for use as Navy transports, but so planned as to be readily converted to passenger vessels for postwar service. The war ended before construction was well under way, and the planned alterations were carried out by the builders, Bethlehem-Alameda shipyard, on San Francisco Bay.

The use of aluminum on these two vessels has been noted in the feature articles heretofore published, but the Aluminum Company of America's David McIntyre has prepared a report on the structural details. 500,000 pounds of aluminum for each ship constitutes a real development in ship construction, and here is how it is distributed:

TYPE AND EXTENT OF ALUMINUM INSTALLATION

The superstructure above the boat deck is of riveted aluminum construction. This superstructure, situated amidships between frames 77 and 141, is approximately 177 ft. long, and 42 ft. wide at its maximum. The boat deck is of steel and the house on this deck is 8′ 6″ high to the Navigating Bridge deck which surmounts the house and has wings at its forward end extending outboard of the house 21′ 9″, the full transverse width being 85′ 6″. On the Navigating Bridge Deck is a house 8′ 0″ high extending between frames 78 and 92 for a distance of about 37 ft. and to a maximum width of about 25 ft. surmounted by a House Top surrounded by a high bulwark forward and sloping away aft.

The superstructure is without sheer but the weather decks are cambered. The house on the Boat deck contains Officers' Quarters, including messes and lounges, Radio Room and other ship offices as well as service rooms and dog kennels. The Navigating Bridge Deck house contains the Wheel House, Chart Room, and several service compartments. Surmounting the Navigating Bridge Deck are twin smokestacks with large streamlined aluminum enclosures. The Navigating Bridge deck is 84 ft. above the keel, and the top of the forward stack, higher by 1 ft. than the after stack, is 45 ft. above the deck and 129 ft. above the keel, or about 100 ft. above the normal load waterline.

The Boat Deck house is constructed of 11/32″ thick 61 ST plate having in general 6″ x 1.92″ x 2.91 lbs. 61 ST channel stiffeners except forward of frame 91 where they are 4″ x 1 5/8″ x 6.25 lbs. steel channels. The Boat Deck House front, however, is of 5/16″ inverted and welded angle stiffeners. The house deck boundary angle is of 3 1/2″ x 3″ x 3/8″ steel. The house side is constructed in two strakes connected by an outside 61 ST edge strap 3 1/4″ wide single riveted and surmounted by an aluminum handrail. Divisional bulkheads inside this house are generally of 1/4″ thick 61 ST plate with 2″ x 2″ x 1/4″ angles in 61 ST for stiffeners and boundary bars. Riveting is generally 1/2″ dis. 53 ST 61 with button heads and points, except end conections to stiffeners which are 9/16″ dia.

The Navigating Bridge Deck plating is 11/32″ thick in 61 ST alloy except in way of the steel inner smoke stacks, where steel construction is used for two frame spaces each side fore and aft. This same construction and extent is used on the Boat Deck house sides. The deck beams are generally 6″ x 1.92″ x 2.91 lbs. 61 ST channels except forward of frame 91 where 6″ x 2 1/2″ x 12 lbs. steel channels are used. The bridge wings plating is 61 ST 1/4″ thick with 61 ST 6″ channel fore and aft. The bulwark all around the bridge is of steel. All deck seams are joggled up, single riveted, and butts are strapped under and double riveted. The deck at sides is surrounded by a 10″ x 2.50″ x 5.43 lbs. 61 ST channel gutter with butts welded and is double riveted to the deck and single riveted to the Boat Deck house side top. A number of girders of aluminum construction support the deck fore and aft. These girders are 15″ deep of 3/8″ 61 ST plate with a 4″ x 3″ x 3/8″ 61 ST angle along the bottom and 2 1/2″ x 2″ x 3/8″ 61 ST angle intercostals fitted at the deck. Deck riveting generally is 1/2″ dia. in 53″ "as fabricated" or 53 ST 61 with button heads and countersunk and chipped points. A few 53 "as fabricated" rivets

in this deck are driven cold. Beam Knee and other end connection rivets are 9/16" dia. When exposed to the weather the deck is to be wood covered, embedded in U. S. Navy Dept. Spec. No. 52-c-12 sealing compound and secured with 24 ST alumilited bolts.

The Navigating Bridge Deck House sides and after end are constructed of ¼" 61 ST plating in two horizontal strakes connected together with a 3" x ¼" flat bar strap outside single riveted. Aluminum stiffeners are 5" x 1¾" x 2.38 lbs. 61 ST generally. The Bridge House front is of ¼" steel plate welded with 5½" tee stiffeners. The deck boundary angle surounding the entire house is 2½" x 3½" x ⅜" steel galvanized. Divisional bulkheads are ¼" 61 ST plate with 2" x 2" x ¼" ST angles. Rivets in the house sides are generally ½" dia. 53 ST 61 with button heads and points.

The House Top is ¼" 61 ST plate with 6" x 1.92" x 2.91 lbs. 61 ST channel beams. The seams are joggled up and butts are strapped and all single riveted using ½" dia. 53 ST 61 rivets with button heads and countersunk chipped points. The deck is wood planked in the same manner as the Navigation Bridge Deck. Along the deck side is a 10" x 2.60" x 5.43 lbs. 61 ST bulwark with a split 1¼" I.P.S. tube rail in 61 ST argon arc welded steel tube rail. Girders are 12" deep of ⅜" 61 ST plate and 2½" x 2" x ⅜" 61 ST angles.

The lifeboats, gravity type davits and electric boat winches are of aluminum construction and furnished by Welin Davit and Boat. Four 36'—6" x 11'—9" x 5'—3", 135 person hand propelled lifeboats, two 36'—6" x 11'—9" x 5'—3", 105 person lifeboat motor propelled and radio equipped, and two 26'—8" x 8'—3⅝" x 8'—7¼", 46 person lifeboats and two 26'—8" x 8'—3⅝" x 3'—7¼", 46 person rescue boats, oar propelled, are provided with a pair of gravity type davits each served by an electric boat winch. All the boats except the after pair are handled and passengers embarked from the Boat Deck. The after pair are handled from the Boat Deck and passengers embarked from the Promenade Deck.

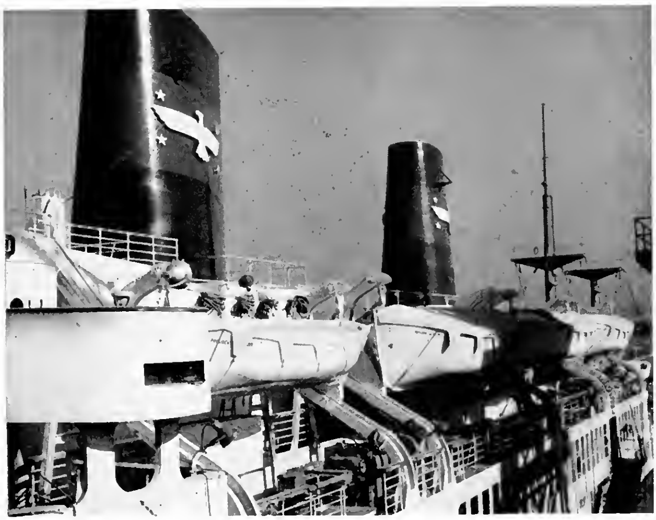
Airports, frames and dead light covers installed in the deck houses throughout the superstructure are of aluminum 214 alloy furnished by Rostand Manufacturing Co., Milford, Conn. These are generally 16" dia. clear opening. Fixed lights 12" dia. are fitted in outside doors and 10" dia. lights in stairway enclosure doors, all having aluminum frames.

Enclosure windows on the Promenade Deck and Promenade Veranda on the Upper Deck as well as casement windows to public rooms are specified in aluminum.

Four accommodation ladders are installed of aluminum construction. They are built at the shipyard to its own design. The castings are of large size, for their platform frames and main moving members.

Stormrails of Aluminated aluminum are installed in passengers' and public spaces, as well as grab rails elsewhere. A number of joiner fittings, hardware, etc. installed in aluminum, as well as direction markers, etc.

The estimated weight of the aluminum structure is approximately 150 tons per ship. Including lifeboats, davits, boat winches, airports, fixed lights, windows, accommodation ladders, handrails, hardware, markers, etc. the total aluminum weight is approximately 250 tons per ship.



Almost every bit of metal in the superstructure of the President Cleveland is aluminum. Included are the smokestacks, lifeboats, davits and walls.

The World's Greatest Naval Base

San Francisco Bay

VISITORS TO SAN FRANCISCO BAY CITIES may see, at first hand, activities of the World's Greatest Naval Base. On the shores of this remarkable harbor are a half dozen cities whose integrated interests support over a half billion dollars of our Navy's plant account. In San Francisco and at Vallejo are two of the largest Naval Shipyards. Oakland, Alameda and Sunnyvale each has a major Naval Airfield. The University of California at Berkeley and Leland Stanford University at Palo Alto participate in the Naval Officers Training Plan, each with a corps of midshipmen. Two of the largest Naval Hospitals are at Oak Knoll, in Oakland, and at Mare Island, in Vallejo, the latter the Navy's artificial limb center. On Treasure Island, reclaimed from the Bay's bottom in the thirties to provide history's most picturesque World's Fair seting, there are now located some of the Naval training facilities for the Pacific Fleets. The Naval Supply Center at Oakland, developed during the World War II to supply the gigantic Pacific war effort, is the world's largest terminal, warehousing center and shipping facility. It is capable of loading thirteen ocean going vessels simultaneously. Close to a million tons of combat veteran men-of-war of all types, now unmanned, but well preserved in "mothballs" (inactivated), rest moored on the Bay's waters. And in their shadows lie the battered hulks of their sister-ships sacrificed to atomic bomb tests, and returned from Bikini for research.

To operate and maintain these facilities our Navy employs 40,000 civilians and 10,000 Naval personnel in the Bay area—a strength, apart from their families, equal to the population of Santa Barbara, or Poughkeepsie.

Here on San Francisco Bay, Headquarters of the Western Sea Frontier and of the Twelfth Naval District, the citizen may inspect his Navy's training and industrial shore plants, visit an active carrier or submarine, see men-of-war under repair and walk the decks of such historic vessels as *Hornet, Intrepid* and *Shangri-La!* Thus, by direct contact, an understanding of Naval defense and its plant requirements and capabilities may be gained, effectively, under interesting and convenient arrangements.

The United States Navy, in the discharge of its duty of informing the American People about the activities of their Navy, will, through the office of Public Information at San Francisco, arrange for conducted tours of Naval installations for conventions coming to the San Francisco Bay Area.

To facilitate tour considerations, details of the various naval activities, with items of principal interest, are listed below.

SAN FRANCISCO NAVAL SHIPYARD
2700 Naval personnel
7500 civilian employees
\$100,000,000 plant account

DRY-LAND, MOCK-UP SUBMARINE—a training device simulating on the shore the operational gear aboard a submarine.

BIKINI ATOM BOMB TARGET SHIPS—including the carrier *Independence,* two personnel transports, and a submarine.

OLD DRYDOCKS—one of which serviced the Great White Fleet during its round-the-world tour in 1908.

NATION'S LARGEST DRYDOCK—capable of holding largest vessel afloat, or two large cruisers, or four average size transports. It is 1100 feet, or almost three city blocks, in length.

WORLD'S MIGHTIEST CRANE—with a total lifting capacity of 630 tons, more than half again as much as any other such facility.

VISITS ABOARD AIRCRAFT CARRIERS—*Intrepid, Hornet, Shangri-la.*

8-STORY MODERN GLASS HOUSE—glass-sided shop for optical, ordnance and electronics trades.

SPECIALIZED REPAIR SHOPS—housing many millions of dollars' worth of tools and machinery (example: Mightiest steel press west of Pittsburgh)—srructural steel, sheetmetal, blacksmith, machine, electrical, woodworking, painting, and pipefitting, plus the supply warehouses, transportation, and utilities shops that back up the productive shops.

"MOTHBALL" FLEET UNITS—Complete task force of carriers, cruisers, and auxiliaries (hospital ship, repair ship and transports) of the San Francisco Group, Pacific Reserve Fleet.

NAVAL STATION, TREASURE ISLAND
6000 Naval personnel

850 civilian employees
$33,500,000 plant account

THE SITE OF THE 1939 WORLD'S FAIR—some Fair buildings remain, such as the present Administration Building and two hangars now utilized respectively as Naval Reserve Armory and as Small Craft and Public Works Shop.

FIRE-FIGHTING SCHOOL—with demonstrations of fighting different types of fire aboard ship.

ELECTRONICS MATERIEL SCHOOL—with demonstrations of electronic materiel such as radar.

DAMAGE CONTROL SCHOOL—including simulated flood conditions aboard ship.

NAVAL MUSEUM—containing models of historical merchant and Navy ships.

NAVAL SUPPLY CENTER, OAKLAND
6000 civilian employees
$85,000,000 plant account
$200,000,000 stored material

WATERFRONT TOUR—pier facilities for thirteen ocean going vessels for loading and unloading of supplies.

COFFEE ROASTING PLANT—6,000 pounds of green coffee, roasted, ground, and vacuum packed every hour.

BOX FACTORY—boxes and crates made for special packing of thousands of items for domestic and overseas shipment.

RE-PRESERVATION SHOP—Naval aviation equipment dipped in special solutions and packed for long term storage.

FIRE HOUSE AND EQUIPMENT—includes fire boat with jet propelled "creeper" attachment for fighting fires under decks and piers.

MEDICAL SUPPLY DEPOT—largest medical supply depot in Navy with over two million cubic feet of space in building 200 feet by 600 feet and five stories high. Handles over 6,000 medical items.

COLD STORAGE PLANT — provides storage for hundreds of thousands of pounds of meat, fish, vegetables, butter and eggs. Some rooms are ten degrees below zero.

ELECTRONICS SUPPLY BUILDING AND EXHIBIT—Navy's latest equipment in the field of electronics including approximately 60,000 different items. Permanent display includes television; radar; sonar; oscilloscope (see what sound looks like) walkie talkie; wire recorder (make your own recording), and other interesting features of radio and electronics.

AVIATION SUPPLY BUILDING AND EXHIBIT—The aviation Supply Depot carries 123,759 different items of naval aviation supplies. During the war NSC Oakland supplied better than 85% of all the naval aviation equipment, materials, and supplies for the Pacific Theatre of Operations. Permanent display includes a cut-away carrier based airplane engine; a jet engine; a parachute; life raft and equipment, and captured Japanese aviation equipment.

LIBRARY—NSC Oakland supplies books for naval libraries aboard ship and at shore establishments in the Pacific Ocean Area. The library carries 2,000,000 books, 4,500 different titles—everything from the classics to the latest best sellers.

STOREHOUSES—More than fifty giant storehouses carrying better than 250,000 different items of Navy supply—the world's largest Naval Supply Center.

NAVAL AIR STATION, ALAMEDA
4350 Naval personnel
8000 civilian employees
$64,000,000 plant account

HOBBY SHOP — thirty-three hobbies offered by trained instructors.

FLEET AIRCRAFT.

CONTROL TOWER.

AIRSTRIP—five runways; all are 500 feet wide, three are 4,000 feet long and two are 5,200 feet long.

MAIN MESS HALL—bakery, butcher shop and galley equipped to feed 5000 men three meals daily.

ASSEMBLY AND REPAIR SHOP FOR AIRCRAFT.

FIRE FIGHTERS TRAINING — demonstration of aircraft fire rescue work with rescue of dummy from burning plane.

GIANT FLYING BOAT MARS—Transpacific seaplane being serviced and loaded. Two flights daily, six days a week.

PACIFIC RESERVE FLEET—various types of carriers and tenders in state of preservation.

VISIT ABOARD AIRCRAFT CARRIER—*Antietam (Essex)* Class, 27,000 tons).

SCREENING AREA—technique of screening and salvaging material returned from overseas demonstrated. This includes aluminum recovery furnace.

TRAINING DEVICES—including link trainer.

VALLEJO-MARE ISLAND AREA
(Mare Island Naval Shipyard)
11,500 civilian employees
$400,000,000 plant account

ELECTRONICS EXHIBIT.

VISIT ABOARD A MODERN SUBMARINE.

MOLD LOFT FLOOR—laying out full scale plans and

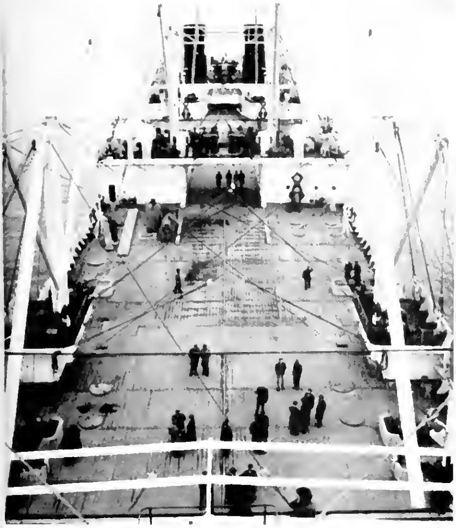
(Please turn to page 91)

Giant Whaling Factory

THE BIGGEST SHIP so far built in Scandinavia, the 25,000 ton whaling factory *Kosmos III* has been delivered by the Götaverken shipyard to the Norwegian whaling company A S Kosmos, Anders Jahre. Everything in this ship is of rather unusual dimensions. It has a length of 638 ft., a breadth of about 79 ft. and a total height of 100 ft., corresponding to a seven-story building, while its flensing decks have an area of about 25,000 sq. ft. The length and beam compare with the *Lurline's* 632 ft. length and 79 ft. beam, and a length of 608 ft., beam 75 ft. for the *President Cleveland* and *President*

KOSMOS III

All pictures courtesy of American-Swedish News Exchange



Looking aft from the bridge house of the KOSMOS III.

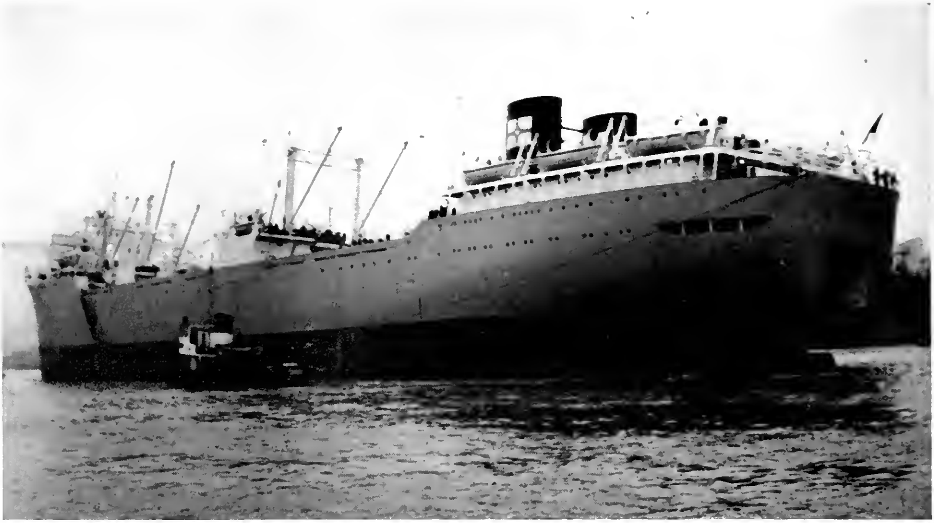
Wilson. On the 'tweendeck is a factory employing over 150 men and capable of producing 450 tons of whale oil a day; and its storage tanks provide space for no less than 1,125,000 cu. ft. of such oil. Including the crew of the whale catchers and the factory workers, the staff on board totals 400 persons, for all of whom there is spacious and modern accommodation and ample provisions, which makes it possible for this "floating city" to be away from civilization for six to seven months at a time. In spite of its great size the ship makes a speed of fourteen knots, being powered by a 8,300 iHP Götaverken Diesel engine.

The building of *Kosmos III* has been followed with keen interest in Scandinavian shipping circles, not only because of the size of the ship but also because it has involved a race for time. According to international regulations, the whale-hunting season starts December 8 and ends on April 8, and the ship had therefore to be ready in good time before the first-mentioned date if the owner was not to lose the income of an entire season; moreover, it should be added, Norway and the world would lose the much needed addition of vital food products which such a ship is capable of producing. The Götaverken shipyard worked against heavy odds.

The launching, which took place on April 9, 1947, was delayed owing to the severe cold of that winter, and the scarcity of material and man power, partly caused by the fact that the yard was engaged on several other big tasks such as the building of the passenger liner *Stockholm* and the cruiser *Tre Kronor,* as well as many tankers and cargo liners. However, thanks to the good cooperation on the part of all concerned—the shipyard, the sub-deliverers in Sweden and Norway as well as the authorities—the Götaverken managed to deliver the ship on time. In the later phase of the work the yard received most valuable assistance from about 150 Norwegian workers, who were placed at its disposal, and a considerable number of whom belong to the crew that are now sailing with the ship to the Antarctic.

Kosmos III, which cost in all some twenty million kronor to build, has an over-all length of 638′ 6″, a length between p. p. of 598′ 0″, a moulded breadth of 78′ 0″, a moulded depth to flensing deck of 58′ 0″ and to factory deck of 41′ 0″. The loading capacity is 25,000 tons on a draught of 35′ 1 3/8″. If the vessel, which between the whaling seasons can be used as a tanker, had been built as an ordinary tankship, its loading capacity would have been about 27,500 tons d. w. The hull is practically all-welded and has been specially strengthened for navigation in ice-filled waters. A considerable part of the welding, especially on the decks, has been performed by automatic welding machines, the longitudinal joints on the two continuous decks alone having a length of 10,500 ft. The ship is provided with corrugated longitudinal and transversal bulk-heads of the Götaverken's special design. She has the usual characteristics of a whaling factory, although the lines are considerably more modern and streamlined than those of previous vessels of this kind. The Captain's bridge and the deckhouse,

Stern view of the KOSMOS III showing the whale-slip through which the whales are hauled to the factory amidships.



The KOSMOS III showing whale-slip in stern.

which are built of light metal, are located well forward, and the Diesel machinery is placed aft, with the funnels one on each side of the whale slipway. Above this the aft boat-deck is also situated. In this way, a very large unobstructed flensing deck has been obtained midships where the whale carcasses are dissected after having been hauled through the slipway in the stern by means of heavy winches placed on a special superstructure on the middle of the deck. Modern electric machinery is used for the cutting-up of the whales.

The factory on the 'tweendeck measures 341 ft. x 78 ft. x 16 ft. in height—which would be a fairly big factory even on shore. At full capacity with the staff working in shifts day and night, it produces about 450 tons of oil a day and gives full employment to some 150 workers. The machinery, boilers, etc. of the factory are of the most up-to-date construction and offer several interesting novelties, which make possible the extraction of more oil than before. Below the factory are 60 oil storage tanks with a capacity of 1,125,000 cu. ft. There are also some 30 tanks for bunker oil, fresh water, etc. In addition to the whale oil, the factory produces vitamin and other medical preparations. One or more chemists are accompanying the expeditions, and they have a special laboratory at their disposal. The ship will be served by ten whale catchers, which are laid up in Walfish Bay between the seasons.

The various categories on board have different quarters and messes, all spacious and practically and comfortably equipped. The largest messroom is that for the factory workers, situated forward, which has seating accommodation for 142 persons, and which is also intended to be used as a cinema and entertainment hall.

In the deckhouse below the bridge are situated the officers' quarters and messes as well as an owners suite, which are all tastefully designed and decorated. The hospital includes operation room, X-ray plant, etc. There is also a shop where the crew can buy various things. The kitchen plant is on a very big scale. The food is transported by lifts to the various cooks' galleys. Provisions for about six months can be carried in the stores, which include refrigerated space for meat, fish and vegetables. Live pigs will also be kept on board.

The *Kosmos III,* naturally, has an extensive machinery plant. Electric power is used to a greater extent than on previous ships of this kind. The power is supplied by five Götaverken Diesel engines directly coupled to 240 kW ASEA generators with a combined effect of 1,200 kW. The steam required for the oil extraction is supplied from a steam plant consisting of six boilers with a total heating surface of 10,360 sq. ft.

Kosmos III is Diesel-engined, which is rather unusual for whaling factories. The engine consists of a Götaverken 9-cylinder single-acting, two-stroke cross-head engine with a cylinder diameter of 680 mm and a stroke of 1,500 mm. It develops 8,300 iHP at 112 rpm, giving the ship a speed of 13.5 knots fully loaded. During the delivery trials a speed of 14½ knots was reached. The two auxiliary engines, each of 200 iHP, are also of the yard's own design.

Kosmos III has been designed by the Götaverken in collaboration with the Norwegian whaling factory experts Arnesen, Chrisensen & Co. and the equipment has been delivered mainly by Swedish and Norwegian firms.

After the delivery trip, which was attended by a large number of shipping experts from all the Scandinavian countries, the ship proceeded to Sandefjord in Norway to complete her stores and crew, and from there she headed for the Antarctic.

Arabia Imports "Magic Carpets"

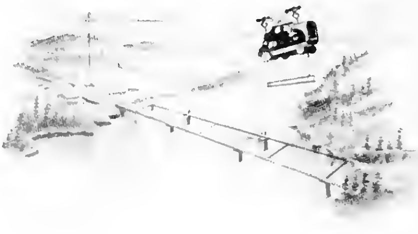
FROM OUT IN THE PERSIAN GULF, where Sinbad used to sail, modern "Magic Carpets" will be used to whisk ships' cargoes ashore, and onto the desert sands of Saudi Arabia. Today's "Magic Carpets" are the revolutionary new Skyhooks which are being installed for the Trans-Arabian Pipeline Co. by Pointer-Willamette Co., Inc., of Portland, Oregon.

The first Skyhook installation for Trans-Arabian is to be used in connection with the unloading of offshore vessels in the Persian Gulf at Ras el Mishaab. It is planned to have ships discharge their cargoes onto a man-made island about three miles off of the Arabian coast. From this point Skyhooks will transport the freight over 20,000 feet of aerial cableway to discharge points onshore in the Dispensal Area.

Erection of a 72-foot prefabricated Skyhook tower on the Arabian desert. Towers are placed at 700-foot intervals between a concentration point near the coastal town of Ras el Mishaab and a man-made sea island three miles offshore in the Persian Gulf. This photo was taken on the spot.

Materials to be handled by the Pointer-Willamette machines will be utilized in the construction of Trans-Arabian's pipeline. Oil from this area will flow 1,050 miles through this pipeline to the Palestinian port of Haifa.

The use of Pointer-Willamette Skyhooks solved a difficult problem which confronted the company constructing the Arabian pipeline. Shallow waters of the Persian Gulf near Ras el Mishaab force ocean-draft vessels to remain three miles offshore. In order to utilize this strategic unloading point, they constructed with piling a small sea island and connected it to the shore by means of a Skyhook installation. The cost of utilizing this form of aerial transportation represents only a small fraction of the expenditure which would have been required to construct a three-mile causeway between the inland and the shore.



CONVENTIONAL SKYHOOK INSTALLATION

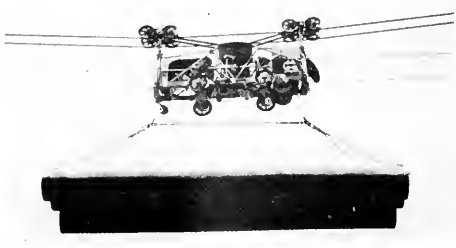
This Skyhook system makes use of a single Skyroad and necessary traction cables. No other power is required to "rig up" or move the cables as the Skyhook machine itself furnishes this, as well as power to propel itself. The Skyhook operator has intimate and complete control of load at all times eliminating hazards of conventional signaling systems.

It is planned to operate two Skyhooks on the single cableway, one behind the other. A third machine will be maintained on a standby status in order to insure an uninterrupted flow of vital equipment and supplies from ship to shore.

Pointer-Willamette developed the Skyhook principle for use in the logging operations of the Northwest. The system utilizes a carriage, which is a complete power in itself, traveling along a cable "skyroad." Traction is obtained through two separate drive cables which pass around traction wheels on the Skyhook. The operator riding in the machine is in complete control of all movements of the Skyhook and its load.

The Skyhook installation at Ras el Mishaab is the first of several that Pointer-Willamette will put into operation in Arabia.

The P-W Skyhook carries nine tons of cargo hour after hour, day in and day out at the Proving Ground.



The Designer Had a Reason for It*

By ROY A. HUNDLEY, Chief Engineer,

Enterprise Engine & Foundry Company

Roy A. Hundley

WHY DID YOU DO IT THAT WAY? Why is this so big? What is this on this side for? . . . These are only a few of the many questions thrown at the diesel engine designers by operators and shop men. The answers to these questions will be attempted by the writer to clarify and show some of the factors on which many design decisions have been made. Hindsight is more frequently and accurately exercised than foresight; and the designer, being the creator, has too frequently been placed in the position of one who should have done differently. The writer was advised by some of his contemporaries that by attempting to explain the reasons why designers did things as they are done would be admitting inadequacies. Not at all! There are no inadequacies present. The diesel engine has successfully met the requirements of industry and is continuing to be applied to new and greater tasks which are being successfully met and accomplished. No little credit is given to the designer for this success. Similarly, the operation and use of the diesel engine has been accomplished to the satisfaction of owners and here again there are no inadequacies. Therefore, any effort to enlighten others to more readily understand your problems and your limitations will develop a very desirable understanding that will brighten the path to development of better equipment.

And that, therefore, is the object of this paper: — to describe the major design problems of a diesel engine in order that you may readily understand the processes carried through to the end which presents a salable, produceable, applicable, trouble-free piece of machinery. There are many individual parts and items on an engine which a paper of this length could only partially cover. Therefore, on each phase of the engine the most important factors of its design will be discussed, how decisions are reached to determine its design, and the branch of engineering or science most necessary in successfully designing these parts.

Like most Engineering problems, there are assumptions that must be made. For the purpose of this discussion, we will go through a design of a four cycle, medium speed, heavy duty, diesel engine which in multiple units would satisfactorily fit a reasonably sized freighter or tanker, and in single units is applicable to large tow boats and large fishing craft. Before the engine gets "on the board", a great deal of conversation development must have come first. It is to be assumed that the Sales Department has expressed a need for an engine of the size and type to be designed. The approximate bore and stroke, speed range, and general type of engine have been decided by mutual discussions between Sales and Engineering. By type, we mean whether heavy duty, slow speed; medium duty, medium speed; or high speed and applications contemplated accordingly. Basically the problem is created and presented to Engineering by the Sales Department who feels that a market exists and that it fits our manufacturing facilities and, when available, can be sold profitably.

The kind of engine can now be visualized by the designer and he goes to work. In the process of the design development, let us consider the engine as having four major parts or sub-divisions.

First is the major moving parts that are responsible for the conversion of heat energy in the combustion chamber to mechanical power and for the transmission of that power to the driven equipment.

Second is the frame or supporting static parts for absorption of the loads imposed to develop the power.

Third is the breathing mechanism, some of which is moving and some static, but which represents a complete division and study in itself.

Fourth is the auxiliaries, such as water pumps, lube

*Presented before the Northern California Section of "The Society of Naval Architects and Marine Engineers" in San Francisco June 4, 1948.

oil pumps, etc., that are actually parasitic loads by nature, and yet are extremely important in the over-all functioning of the engine.

We shall discuss the parts in the order named, not because of their relative importance, for one can not lose sight of any of the major parts during the development, nor is any phase less important than the other. The order is selected because the first items listed are the most basic in their over-all effect on the size and space requirements and location of many other parts. The three succeeding basic sub-divisions, in the order named, likewise rank in their basic effect on the over-all design problem.

The Crankshaft

The first consideration is the crankshaft. Once this part is fixed and established, it is almost impossible to change it without completely redesigning the engine. It must, therefore, be carefully analyzed to be sure that it is right before establishing its size and design. The crankshaft must be large enough to transmit the maximum horsepower rating. It must be stiff enough to withstand peak firing forces. It must be torsionally stiff to eliminate the possibility of being susceptible to critical vibrations, and it must be of sufficient size to provide adequate bearings which must stand up in the type of service anticipated. Because the crankshaft is probably the most important part of an engine, its size limitations and design characteristics have been greatly influenced by such bodies as the American Bureau of Shipping, Lloyds Register of Shipping, and groups of similar interest. Not only the design, but also the physical properties of the material selected are of interest, and minimum limits of the physical properties are set by these groups. The crankshaft is an extremely complex part, by nature, and defies highly accurate determination of stresses and loadings. The design has, therefore, been established, to a great extent, by precedent, rule of thumb and empirical equations. Most of the above bases for crankshaft determination, however, give minimum requirements and the designer must exercise his judgment in establishing the increase over minimum requirements that is to be economically used.

Once the bore has been selected, and we have assumed that it has, good practice dictates that a cylinder centerline to cylinder centerline distance of 1½ times the bore is a good value. This can be less on smaller engines, but generally is not less than 1.4 times the bore. 1½ times the bore gives an acceptable amount of space for cams, fuel injection equipment, valves, water jackets, etc., and yet does not cause the final design to be excessive in length. In order that the crank webs may be as thick as possible and yet provide adequate bearing area in the mains and crank pins, the approach is generally to make diameters large and lengths relatively short. The limit on the crank pin diameter is established mainly by making it as large as possible and still being able to remove the foot of the connecting rod through the cylinder liner. Greater diameters than that which is set by the above limitation can be achieved by use of more complicated connecting rod bearing designs. Cost is always before the designer as an important characteristic of the engine and, therefore, the above restriction is a practical one. With this limitation as an accepted feature, it is possible to obtain approximately 65% of the bore as the crank pin diameter. Bearing research has developed the most effective length to diameter ratio. Using this information, and having from experience a reasonably accurate forecast of maximum firing pressures, the crank pin length can be established. This length-diameter ratio is between .7 and .8. Our crank pin length then becomes approximately half the bore.

Main bearing diameters must now be established. Here a consideration of economy balance against desirable stiffness must be exercised. Experience has shown that from 70% to 85% of the bore is an acceptable value. Using the reasonably length-diameter ratio for main bearing length, the crankshaft in its over-all length determination has been established. The webs have been determined by considering the cylinder center distance and acceptable lengths for the bearings. The width of the crank webs is selected in order to have an adequately stiff beam in bending and still fulfill the minimum requirements of such governing bodies as American Bureau of Shipping, etc.

Another subordinate but important role fulfilled by the crankshaft is to act as an oil duct to pass lubricating oil to such parts as connecting rod bearing, wrist pin, and piston cooling, when required. The crankshaft having been designed, the designer's notes on the detail drawing perform an extremely important function to rigidly specify material, heat treatment, when necessary, the fillets and radii, quality of finish and degree of balance. These decisions assumed by the designer are influenced first by the requirements and second by the skills and tools in his own shop or wherever the part may be made.

It was shown that, during the development of the crankshaft, the sizes of the bearings were determined by necessity. Calculations can now be made using conservative values for firing forces and reasonable weight estimates for the revolving and rotating parts. In the selection of bearing materials and bearing designs, the ex-

(Please turn to page 82)

Serge P. Kovaleff, vice president in charge of Sales, Enterprise Engine and Foundry Company (left), and John Kooistra, Carrier Corporation, snapped at the Naval Architects' meeting.

THE PROBLEM OF ESTABLISHING STEAMER FREIGHT RATES

VERY FEW SHIPPERS have any comprehension of the factors that enter into the establishment of freight rates, and, as a matter of fact, very few care very much. The rate itself is all that matters. This is an unrealistic attitude, for it is just as much a part of the business of shipping to obtain compensatory rates as it is for an exporter to obtain a compensatory price. The shipper, in fact, should be interested in seeing that a carrier gets a fair rate, for if the rate is inadequate, the service will suffer or disappear.

There have been many arguments prepared by carriers and traffic experts to justify particular rate structures, but they all have at least the appearance of being prejudiced. The recent hearing by the Maritime Commission's Chief Examiner, G. O. Basham, resulted in a report in which both sides of an argument were weighed and a decision recommended that favors the requested increase, although a delay of more than a year leaves the applicant at a considerable disadvantage.

The case is that of the Matson Navigation Company's rate structure effective March 1, 1947, calling for a general increase of 22 per cent. These rates were suspended by the Commission with permission to proceed in behalf of a 20 per cent increase. The recommendation is so complete, dealing as it does with various Matson enterprises and their relationship to shipping, that it seems worthwhile to publish the entire report:

The Recommendation

This investigation was instituted June 4, 1947, to determine whether the rates, charges, regulations, and practices of Matson Navigation Company and other respondents[1] in the Hawaiian trade are unduly prejudicial or unreasonable in violation of section 16 and 18 respectively, of the Shipping Act, 1916.

1 The Oceanic Steamship Company, Isthmian Steamship Company, and American President Lines, Ltd., were also made respondents on June 4, 1947; Lykes Bros. Steamship Company, Inc., United States Lines Company, and Waterman Steamship Corporation were named as additional respondents.

Intervening were California & Hawaiian Sugar Refining Corporation, Fibreboard Products, Inc., International Longshoremen's and Warehousemen's Union, and Honolulu Consumers Council. The Consumers Council was the only intervener which offered testimony. Officers of Matson and of other respondents testified as to their respective operations.

Matson is the principal water carrier in the Hawaiian trade. It operates a Pacific-Hawaii combination passenger and cargo service, a Pacific-Hawaii freight service, and an Atlantic-Gulf-Hawaii freighter service. The latter is a joint service with Isthmian. The other respondents operate principally to the Far East, and serve Hawaii only incidentally. Uniform rates are observed by all respondents under a conference agreement approved by the Commission pursuant to section 15 of the Shipping Act. Matson is the rate-making line, and this inquiry deals primarily with its rate structure.

Hawaii's economy is tied in closely with that of continental United States. It exchanges sugar and pineapple, mainly, for foodstuffs, manufactured goods, fuel and lumber from the mainland. In 1939 its population had increased 59 per cent and its agricultural production 100 per cent, over 1920. But by 1946 the change from 1920 was an increase in population of about 100 per cent, whereas agricultural production had increased only 55 per cent. This perhaps accounts for its present unfavorable trade balance which, until the recent war, was favorable. Shipments from Hawaii in 1947 exceeded $200 millions in value.

Matson began pioneering the trade in 1882 and since World War I, has developed the tourist trade, built hotels, established a lumber service from the Northwest, an Atlantic service through the Canal, refrigerator service and bulk sugar and molasses transportation.

Its fleet of 33 ships aggregating 275,000 tons was requisitioned by the Government and operated by Matson as agent during World War II. Private operation was resumed in June 1946. At time of hearing in January 1948

Matson had completely rebuilt its fleet with the purchase of 15 C-3 type ships, nine of which were in service and six were undergoing reconversion. Reconversion of the passenger liner *Lurline* was practically complete at an expenditure of around $13 millions of Matson's own funds.

In all, Matson's commitments for floating and other equipment are around $52 millions of which $43 millions have been expended.[2] This program has reduced its marketable securities from $12 millions in February 1947 to around $½ million in November 1947; and has increased its current working liabilities $3 millions during the same period. Also it has necessitated bank loans of $6 millions, and arrangements for another loan in the same amount. Moreover, Matson is guarantor of bank loans of Oceanic, its subsidiary, amounting to $4 millions.

The entire new fleet is to be in operation by july 1, 1948, on the following schedule: freighters are to sail weekly from Los Angeles and San Francisco; fortnightly from Northwest ports; fortnightly from Atlantic and Gulf ports (3 vessels) in conjunction with Isthmian; and every 20 days in the lumber service. The *Lurline*, replacing the *Matsonia*, started in April 1948, on a 12 day turnaround between Honolulu and Los Angeles and San Francisco alternately.

Originally Matson filed increased rates to become effective March 1, 1947, which were designed to raise revenues approximately 22 per cent. These rates were suspended in Docket 656, without prejudice to the establishment of rates designed to produce an over-all of 20 per cent. The latter rates were filed to become effective either on March 1 or March 10, 1947, and are the subject of this inquiry.

Justification advanced by Matson for the rate increases is the rapid and continuous rise in operating costs. Also, comparisons are made with increased rates in other trades.

Vessel and cargo expenses on actual tonnage carried in the Pacific-Hawaiian service have increased (1947 over 1941) by the following percentages:

Insurance	123.85 per cent
Repairs	19.96 per cent
Sea expense	89.93 per cent
Cargo handling	102.27 per cent
Port charges	30.82 per cent
Grand total	93.36 per cent

Expenses in 1947 divided approximately 61 per cent to cargo and 39 per cent to vessel. These increases are illustrated by a comparison of cost per ton of cargo carried by the freighters *Manukai* and *Manulani* on voyages made in 1941 and 1947 respectively. The percentage increase in cost as to the former vessel was 110 per cent, and the latter 96 per cent. The wage increase on the *Manukai* averaged 91.7 per cent. Increased voyage time was 13 and 9 days respectively, due to port congestion in the Islands. The operating vice president of Matson testified: "Everything that we buy has gone up anywhere from 35 per cent to 275 per cent" (1947 over 1941).

In the intercoastal trade, westbound rates on six selected commodities have been increased since 1939 in amounts ranging from 18.56 per cent on automobiles (new unboxed) to 66.81 per cent on canned goods, N. O. S. Prospective increases during 1948 would increase these percentages to 26.46 per cent and 77.93 per cent respectively. Eastbound intercoastal, the increases ranged from 54.90 per cent (1947) and 65.22 per cent (1948 prospective) on dried fruit to around 67 per cent (1947) and 78 per cent (1948) prospective) on lumber and canned goods. Increases made in January 1948 in rail rates, over the 1939 level, between San Francisco and eastern points on substantially the same commodities range from 25.32 per cent on wool to 50 per cent on canned goods.

Since 1940 Matson has increased rates between Hawaii and Pacific coast ports on general merchandise 70 per cent; canned pineapple, 76 per cent; lumber 66 per cent; bagged raw sugar, 77 per cent; feed, flour, etc., 62 percent; fertilizer, 59 per cent; and common building cement, 86 per cent. Little or no increases had been made at time of hearing in rates on refrigerator cargo and rates on molasses, fuel oil and asphalt liquid, in bulk,[4] which are influenced by tanker competition.

Matson's rates yield lower ton-mile earnings than rates in six other offshore trades, such as the New York-Havana and Seattle-Nome trades.

On certain selected items of food and clothing, the increased transportation cost resulting from the last rate increases ranges from $.001 on a pound of potatoes to $.014 on a pair of men's shoes. Nails would be increased $.001 per pound and refrigerators, $1.91 each. The Consumers Council estimated from exhibits of record that the increased landed cost of principal commodities imported from the mainland in 1947 was $2,639,000. Its witness testified that the cost of living in the Islands is approximately 25 per cent higher than on the mainland. The present freight rates average 3.81 per cent of retail prices on 17 food items in Honolulu as of September 15, 1947, which prices on the average are lower than in New York, but higher than in San Francisco and Seattle. For instance the 17 items cost approximately $.05 per unit more on the average in Honolulu than in San Francisco. The freight rates on these items from Pacific Coast ports to Honolulu average about $.024 per unit.

The following table shows earnings (or losses) from vessel operations for the calendar year 1947[5] based on actual operations; also assuming that the present rates

(Please turn to following page)

2 This includes $18,682,338 estimated cost of restoring the *Lurline* (including $5 millions paid by the Commission); and an average of around $1½ million each for the Hilo bulk sugar plant, Royal Hawaiian Hotel, and Matson office building.

3 Other commodities rated were machinery, iron and steel articles and cotton piece goods.

4 Official notice is taken of increases made on April 1, 1948, on molasses, fuel oil and asphalt liquid, in bulk, ranging from 23 to 50 per cent.

5 December operations are estimated.

Steamer Freight Rates

(Continued from preceding page)

had been in effect the full year, and that expenses had been incurred for the full year on the basis prevailing on December 31, 1947.

	Freight Service Combined (1)	Passenger Service (*Matsonia*) (2)	Total (3)
(A) 1947 vessel operations			
Net profit (or loss)	($61,651)[1]	$156,762	$95,110
Depreciated investment plus working capital	20,312,900	1,526,998	21,839,898
Return (percent)	none	10.27	0.44
(B) 1947 vessel operations at increased rates full year and expenses prevailing December 31, 1947			
Depreciated investment Net profit	129,239[2]	93,738	222,977
plus working capital	20,416,900	1,561,998	21,978,898
Return (per cent)	0.63	6.00	1.01

1 Pacific service lost $130,505, and Atlantic-Gulf service earned $68,-853.

2 Pacific service would have earned $82,614, and Atlantic-Gulf service would have earned $16,625.

Earnings before taxes reflected in the above table are higher than shown by Matson by $257,893 on freight service and $39,144 on passenger service due to the exclusion of inactive vessel expenses and depreciation on vessels not employed in the Hawaiian service during 1947; also charter hire revenue on passenger vessels not applicable to the period used.[6]

Matson discontinued payment of quarterly dividends on June 15, 1947, which had been paid regularly since 1906. Since 1937 dividends have ranged from a high of $1.50 per share to 60 cents in 1947. Its stock declined progressively during 1947 for a loss of around 8½ points. Matson capital stock, without par value, has a book value of $20.18 per share.

Matson estimates that earnings under present freight rates during the calendar year 1948, with its new fleet in operation the entire year, would yield less than 3 per cent on capital employed in its freighter services. Estimated earnings after taxes but before return are $702,865 on the West Coast freighter service and $119,-926 on the East Coast freighter service. Capital employed in these services would be $32,186,436 and $5,420,637 respectively. While the *Matsonia* earned 10.27 per cent in 1947 on its depreciated investment of around $1½ millions, it is anticipated that a year's operation of the *Lurline* will yield earnings of $340,314 after taxes, on capital employed of $17,110,855, or a return of approximately 2 per cent.[7] Of the 1948 revenue dollar it is estimated that 2.66 per cent will be available for return on investment, 45 per cent for cargo handling and 35 per cent for vessel expense, the largest items of which are wages and fuel. In estimating expenses no account is taken of increased expenses which might result from the arbitration just completed on wages of firemen, cooks and stewards, engineers and radio operators. Moreover, during 1948 negotiations as to possible wage increases will be conducted with the longshore, clerking and seafaring personnel.

Isthmian's operations in the Hawaiian-Atlantic-Gulf service in 1947 under the present rates resulted in an estimated net loss of $13,687. American President Lines incurred a net direct vessel operating loss of $10,876. Oceanic lost $44,457. The other respondents made only incidental calls at Hawaiian ports.

6 The items excluded were charter hire on *Lurline* and *Matsonia*, depreciation on *Lurline*, *Hawaiian Refiner* and *Hawaiian Wholesaler*, and inactive vessel expense during reconversion of freight vessels.

7 Matson's passenger carryings in 1947 were only one-half of its carryings in 1940, the reduction being attributed to subsidized competition of Pan American Airways and United Air Lines.

Conclusions

From the foregoing recital of facts it is clear that Matson's 1947 common carrier freighter operations in the Hawaiian service were conducted at a loss. It is apparent also that little better than an even break would have resulted had the increased rates of March been in effect, and the expenses prevailing on December 31st been incurred, during the entire year of 1947. Moreover, if Matson's estimates of prospective traffic and expenses prove reliable, 1948 operations will yield only a modest rate of return on investment.

These conclusions exclude any consideration of Matson's non-common carrier activities such as hotel operation, air transport business, and common carrier or charter operations in other trades. Also excluded from consideration are revenues, expenses and investment relating to vessels which performed no common carrier service during 1947. Passenger operations, which are analyzed merely to show their relation to freighter operations, paid their way in 1947, and thus cast no burden on freight services. Moreover, according to Matson's estimates for 1948, the passenger service will earn as much return on investment as the freighter services.

The rate base upon which return is computed is Matson's depreciated investment in physical property and equipment used and useful in common carrier operations in the Hawaiian services during the period under review, including working capital equal to one and one-half months' operation costs, plus material and supplies.

In opposition to the rate increases, the Consumers Council alleges in substance (1) that the increases have an inflationary effect upon the cost of living in the Islands, (2) that rate increases would not be required under more efficient management and operation and (3), that Matson is in a strong financial position and could well forego the increases.

The Consumers Council states, in brief, that the prices of food and other commodities in Honolulu average about 20 per cent higher than in mainland cities. However, it admits that in addition to freight rates, high labor costs and wholesale and retail mark-ups are factors which create this cost differential. The transportation factor cannot be too controlling if, as shown by the record, freight rates average less than 4 per cent of retail

(Please turn to page 86)

Pacific World Trade

NEW MATSON TERMINALS AT HONOLULU

This is an aerial view of the Matson Terminals at Honolulu. The S.S. HAWAIIAN EDUCATOR is seen alongside as she is discharging mainland cargo into the terminal, which is 1,450 feet long and 250 feet wide.

The new Matson Terminals at Honolulu Harbor, built by the Oahu Railway & Land Company, cover an area of ten acres and are equipped to handle more than 20,000 tons of freight. 1,450 feet long and 250 feet wide exclusive of apron, the new terminal can berth and handle at the same time two of Matson's new C-3 freighters.

The latest innovations for the convenient handling of cargo have been installed at the terminal, and its concrete decks, fire walls, sprinkling systems and steel cages make it practically fireproof. A 30-foot apron on the slip side of the piers provides for the unloading of cargo from the vessels and on the shore-side of the piers is an esplanade, 150 feet wide with steel curtained doors which are opened up for the delivery of cargo to waiting trucks that can be backed up directly to the door.

A view of the broad expanse of the steel shedded area. With concrete decks and a minimum of obstructions this terminal is reputed to be the finest freight terminal in the western hemisphere.

June Meeting of Junior World Trade Association

Robert Bruce, sales manager for the Freight Department of American President Lines, who was speaker for the June meeting of the Junior World Trade Association. His subject was "The Future of World Trade in the Pacific."

Junior World Trade Association June Meeting. ►

Globe Completes Mechanization

Globe Wireless Ltd. announces the change-over of its San Francisco-Shanghai circuit from Morse operation to fully automatic Globe Radiotype, the completely mechanized system for transmission and reception of messages developed by International Business Machines Corporation.

With the inaugauration of exclusive Globe Radiotype on the San Francisco-Shanghai circuit, Globe Wireless becomes the first international telecommunications carrier to become one hundred per cent mechanized on all its international circuits.

Thus Globe has attained the goal which they have been aiming toward ever since they reopened their circuits after the war. Complete mechanization eliminates the human element in transmitting and receiving messages and it enables them to attain greater speed, greater accuracy and dependability in the handling of volume traffic between major world centers of trade, commerce and finance.

Globe Radiotypes, a wartime development, have been described as the world's fastest radio-teletypes, for they operate consistently at a speed in excess of 100 words per minute.

These machines are revolutionary in design and operational characteristics. The conventional shift of the typebasket has been eliminated, thereby increasing the speed of operation by approximately 20 per cent and considerably reducing the error potential.

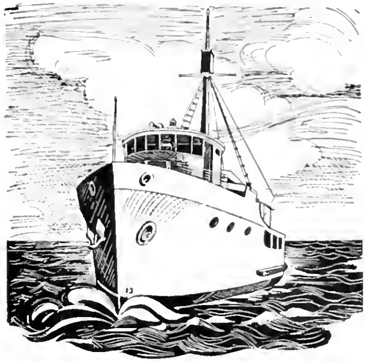
Operation of Globe Radiotype is accomplished by means of an electronic permutation unit, on a six-unit code basis as compared with the older, five-unit system. This affords a wider range of code combinations and offers increased speed and accuracy. The keyboard has 42 keys, instead of the conventional 31 used on older teletypes.

Globe Wireless radiogram service is now available to the Hawaiian Islands, the Philippines, China, Hongkong, Macao, Indo-China, Java and Malaya, including Singapore. Globe also operates an Atlantic circuit to Havana, Cuba.

Three's a Crowd

◄ And this crowd was recently welcomed, all on the same day, as new members of the Junior World Trade Association. Associates of the newly formed Montgomery of San Francisco, they are, left to right: David L. Mears, Donald J. Youngman and Werner W. Trueb, Manager of the European Division.

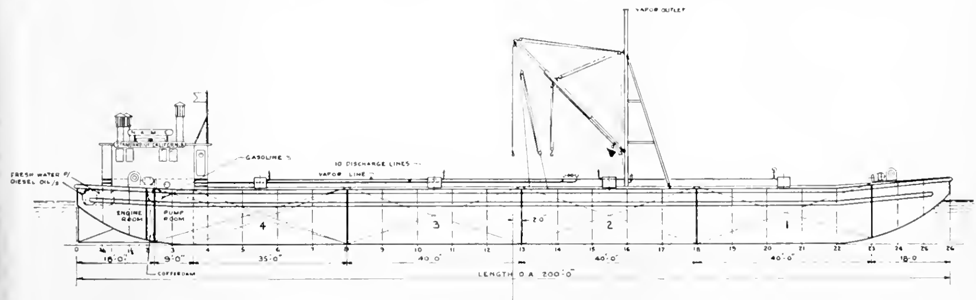
Coast Commercial Craft



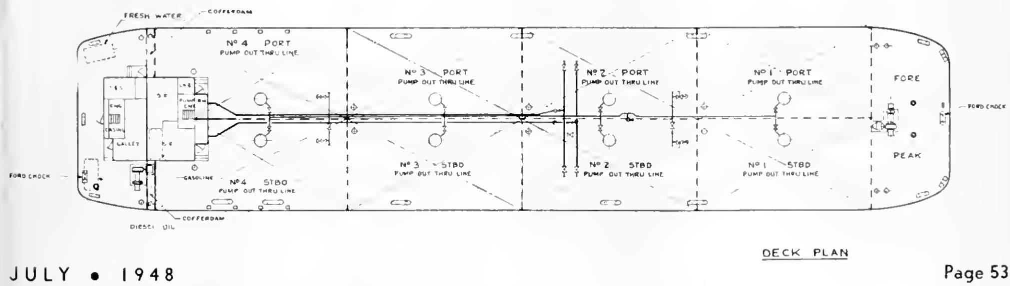
Moore Dry Dock Builds Standard Oil Barge

The Marine Department of Standard Oil Company of California has developed plans for a 14,700 barrel oil barge for inland water service with a number of novel features. Moore Dry Dock Company won the contract for construction on a bid approximating $400,000, and both Standard and Moore are quite proud of the plans.

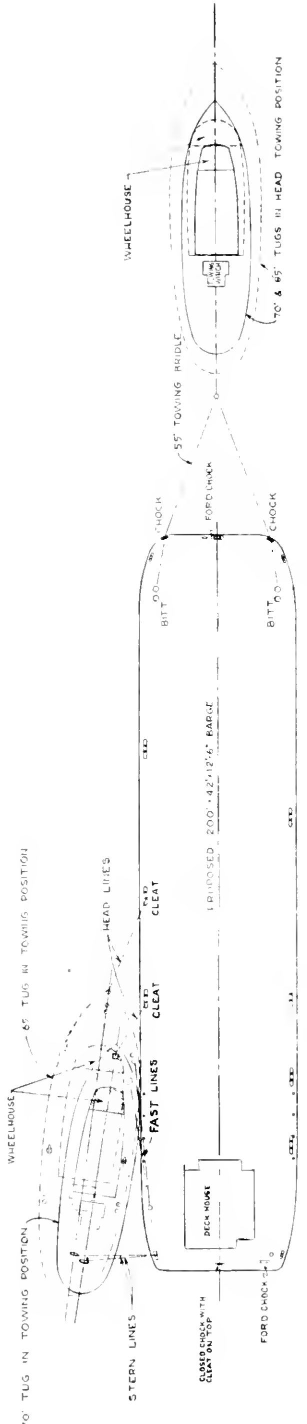
One of the special features in connection with this project is the trying out of models in the University of Michigan's model basin. One of the problems in bay and river towing is the tendency of a barge to "yaw" and the three models which were used in this case re-



PROFILE



DECK PLAN



sulted in what the architects hope to be an evenly towed craft.

The barge is a single-deck steel vessel of all welded construction.

Dimensions and particulars of the barge are:

Length, B.P.	200′ 0″
Length, O.A.	200′ $8\frac{3}{4}$″
Breadth, Mld.	42′ 0″
Depth, Mld.	12′ 6″
Draft, Designed Max.	11′ 3″
Corresponding Displ., F.W.	2340 Tons
Light Ship	422 Tons
Corresponding DW, F.W.	1918 Tons
Volumetric Cap., 100% Full	14972 Bbls.
Volumetric Cap., 98% Full	14672 Bbls.

suitable for carrying a variety of petroleum cargoes in bulk under deck. It will be divided into four cargo tanks by means of oiltight transverse bulkheads and a continuous oiltight longitudinal center line bulkhead dividing the four cargo tanks into eight cargo compartments. The forward end is to be a buoyancy space and the after end a pump room and engine room.

In designing the structure it was arranged that large sections be "shop" fabricated by means of down hand welding. While every possibility for reducing weight was adopted, the structure as a whole is unusually sturdy and is built of steel of a considerably greater thickness than usual for a boat of this kind.

A tripod mast is provided to which is fastened a boom and rigging for handling heavy hose and the mast will also serve as a vapor escape in the manner illustrated on page 56 of the April *Pacific Marine Review*.

The drainage system is so planned as to permit prompt emptying of the individual cargo compartments. Serrated longitudinals allow complete drainage toward the suctions. It is planned to use individual tanks for varying petroleum products from season to season and sometimes from trip to trip. A Kinney Heliquad rotary pump will be capable of discharging 2,000 barrels per hour. The engines for driving cargo pumps are Caterpillar Diesel capable of carrying a sustained load of 126 BHP. Other pumps include Waterous Rotary for fire protection and general service, and pump room bilge pump. The fresh water pressure set is the Fairbanks-Morse "package unit" as is the salt water pressure set. The lighting generators are Kohler.

In any tanker the heart of the structure is the piping and valve system and Standard's architects gave many minute details for installation of these features. The angle of installation and the radius of bends are indicated as well as the sizes and method of attachment. Plenty of flanges and unions are provided to facilitate overhaul, and connections to pumps and tanks are flanged.

Gate valves with non-rising stems are to have indicators, and valves in cargo tanks and forward buoyancy space are to be operated from the deck by means of solid reach rods with handwheel stands and indicators.

The cargo handling systems are laid out so that two methods of cargo can be discharged simultaneously without contamination. All cargo suction lines are kept as low as possible and on the same plane and the bottom of the bell-mouths are to be one inch above bottom of tank. All gate valves in pumproom, on deck and within tanks are Walworth-Wescott.

The galvanized engine room grating is Blaw-Knox or Irving, and towing chocks are Hyde Windlass Company's. Butterworth tank cleaning machines are provided. There are Monel Metal screens at ventilation and other vents and a "Buffalo" LL Conoidal fan in the pumproom.

One Bower Mushroom 1200 lb. anchor and one Danforth 500 lb. stream anchor are specified, with sixty fathoms of one inch steel wire and two fathoms of $1\frac{1}{8}$″ stud chain cable. Also provided is a sixty-fathom $8\frac{1}{2}$″ manila towline and two sixty-fathom $7\frac{1}{2}$″ manila hawsers.

Eight automatic tape gauges are provided by Shand and Jurs. A ten-person balsa life raft is mounted on the deck. Tanks other than cargo tanks are as follows:

One Diesel oil fuel tank—500 gallon capacity.

One Fresh water tank—500 gal-

(Continued on page 88)

Marine Insurance

The London Letter

By Our United Kingdom Correspondent

New Argentine Insurance Law

WHILE IT IS NOT YET CLEAR how far the new Argentine Insurance Law will affect British marine insurance business, underwriting people in the United Kingdom are fully expecting the worst. The first reports from Argentina are to the effect that the new insurance law will prove even more drastic in its limitations on foreign insurers than was anticipated. For example, it is reported that the decree specifies that the buyer shall be responsible for imports and the seller for exports, the situation thus being "loaded" in favor of Argentina. Time will show; but individual opinion in London is still to the effect that the Argentine authorities will regret their totalitarian action, and that it will yet be found that they have "bitten off more than they can chew."

York-Antwerp Rules

Referring to the general disappointment that had been caused by the non-adoption of the 1924 York-Antwerp Rules in full in the United States, Mr. W. D. Wattleworth, in his annual meeting speech as retiring chairman of the Association of Average Adjusters, in London, said that never had the need for international unity and co-operation been so great as at present. Differences with regard to the York-Antwerp Rules might seem a small matter compared with the tremendous issues which faced the world today, but what applied to large matters also applied to smaller ones. The United States was a great maritime nation whose ships carried cargoes, often more valuable than the ship, to and from countries which had adopted the 1924 Rules in full, yet, for reasons which seemed good to herself, America had adopted only a mutilated form of the Rules. It was worth a determined effort on both sides to resolve the present differences. All were in agreement on the vast majority of points, and he did not think the difficulties in the way of complete agreement were insuperable, neither did he think the differences were really so great as was sometimes believed.

Review of Commercial Union Assurance Co.

The Commercial Union Assurance Company, Ltd., London, attributes its big expansion in net marine premium income in the year 1947 (the income amounted to £1,855,614, or £694,290 more than in the previous year) to "the increased activity of our world-wide organization, coupled with the delivery of new vessels and the substantial rise in shipping values." The Company's annual review continues:

"Losses through theft and pilferage have continued to be the most serious risk to merchandise in transit whether at home or abroad, and, although much can and is being done to combat this loss, so long as many commodities and consumer goods are in short supply we shall have this problem with us.

"1947 has been a year in which underwriters have had to meet an increasing number of total losses, including one for £1,865,800 caused through the destruction by fire of the *Monarch of Bermuda* whilst at a shipbuilders' yard for reconversion—the largest single hull loss since that of the *L'Atlantique*, also by fire, in 1933. This loss emphasises the importance of adequate fire patrols and fire fighting equipment on this type of risk, and it is to be hoped that complete precautionary measures may be the means of preventing such serious losses in the future."

Liverpool & London & Globe Insurance Review

The Liverpool and London and Globe Insurance Com-

pany, Limited, in its review of the year 1947, states:

"The increase in the number of casualties, and the rise in world prices which has increased the cost of repairs and other liabilities, are reflected in the results of our hull business. We are also still suffering from the difficulties which have been encountered during the last few years in almost all parts of the world through delays affecting the carriage of goods and the consequent increased opportunities for loss and damage. It is important that remedial action should be taken by all concerned with the safe carriage of the world's valuable productions in the interests of the common good.

"In the 1947 account, premiums have again increased, partly by reason of increased values, and partly by the greater volume of world trade."

Royal Insurance Review

The Royal Insurance Company, Ltd. (an associate of the Liverpool and London and Globe Insurance Company, Ltd.) reports as follows in respect of its marine business:

"The marine account for 1946 has been closed with a profit of £162,302, which is much smaller than the profit on the 1945 account, but we are now seeing the transitional effects of the early postwar period—the later presentation of claims, due partly to the deferment of ship repairs—and it has been necessary to transfer to suspense account, to take care of third and subsequent years' outgoings, a larger sum than in 1946.

"The net premium income received in 1947 was considerably greater than in the preceding year, and this carries with it a greater liability as rates generally have continued to fall. Due to the persistence of abnormal trading conditions, and the unsettled state of affairs in so many parts of the world today, this reduction of rates is a matter of concern to underwriters.

"Congestion at ports has added to our difficulties, and has unfortunately provided greater opportunities for loss of and damage to goods, particularly those which are scarce or rationed. These losses have been aggravated owing to present-day methods of packing and the use of containers which fall short of prewar standards.

"We hope that the publicity given to these points during the past few months will serve to impress upon all those engaged in the handling and transport of goods a fuller realization of the enormous waste of the resources of the world which is occurring in these times of scarcity."

London Assurance Increase

In his statement to shareholders of The London Assurance, Mr. R. Olaf Hambro, the Governor, remarks:

"The increase in premium income is obviously concerned with inflationary tendencies, both as they are concerned with values of hulls and of cargoes. Claims are likely to show a heavier incidence for two reasons, one the costs of repairs in the hull section of our account, which costs are continuously increasing, and the other, the claims we have on the cargo side arising from pilferage and inadequate packing.

"Pilferage, so long as consumer goods are in short supply, is a most difficult hazard to control. We are happy to see an improvement consequent upon the cooperation which has been so readily accorded as between the various interests concerned, namely, exporters, dock authorities, wharfingers and the like, with insurers. It is obviously of extreme importance in the national interest that goods difficult of replacement should be protected, and this is the motive actuating all who are concerned with the problem."

Repair Costs Still Rising

Another of our leading marine insurance authorities, Lord Courtauld-Thomson, chairman of the Merchants' Marine Insurance Company, Ltd. (established 1871), London, for which undertaking Messrs. Willis, Faber & Dumas, Limited, act as marine underwriting agents, has given some interesting and instructive views on the course of world marine underwriting. Pointing out that he referred, a year ago, to the ever mounting cost of repairs in the shipyards of the world, he expresses regret that, "contrary to our experience after the 1914-18 war, costs show no signs of falling: indeed, there is every indication of further increase." Lord Courtauld-Thomson goes on:

"The effect of this continued rise in the cost of repairs must inevitably reflect itself in the running off of hull accounts for many years to come. Again, with the end of the war and a return to more normal and indeed improved conditions of navigation, such as the use of Radar, it was to be expected that the number of casualties on the high seas would have been fewer than those arising during the war years. The annual return of casualties compiled by the Liverpool Underwriters' Association has, however, shown exactly the reverse, and the casualties to vessels of 500 tons gross and over in 1947 were over 50 per cent. greater than in 1944.

"So far as British hull business is concerned, the elasticity of the Hull Understanding and the loyal support which has been given by underwriters, have been of benefit to the Marine Companies, although, in view of the abnormal cost of repairs, it is still doubtful whether the current rates are adequate."

Radio Advisory Service

The Chamber of Shipping and the Liverpool Steam Ship Owners' Association have established a Radio Advisory Service on behalf of British shipping which is financed jointly by the two organizations. The functions of this service include the giving of confidential advice to individual firms requiring it in the many electronic problems which are now arising, and ensuring, in general, that British shipping managements, irrespective of size, are kept effectively in touch with developments. Captain F. J. Wylie—who, until recently, was Director of Radio Equipment at the Admiralty, and was largely concerned with the preparations which made possible the production of radar for the Merchant Navy—has been appointed to direct the Radio Advisory Service.

"Unsinkable" Lifeboat

A newly invented type of "unsinkable" lifeboat (named "Gaskin" after the inventor, Mr. H. A. Gaskin,

(Please turn to page 104)

Admiralty Decisions

By HAROLD S. DOBBS *of San Francisco Bar*

"RUNNING" ALIENS

IN THE GENERAL PRACTICE of the law and particularly in the specialized field of admiralty, lawyers and proctors alike become involved in immigration proceedings of every conceivable type. Whenever I have had any experience with such matters, I have come to more fully realize the importance of my citizenship. It is difficult to express the seemingly unsurmountable obstacles that confront the average foreigner who seeks admission to the United States. The laws are strict and rather inflexible, and so, as with other inflexible rules, some see in them an opportunity to capitalize by "selling," or as I have entitled this article "running" aliens. Most of us will recall the prohibition era during which rum running and other intoxicants were delivered to the shores of the United States illegally and through devious means and methods. In the same way, aliens have been delivered to the shores of the United States through the years, and have in many cases completely escaped apprehension by the authorities for a good many years, and in many cases, without ever being apprehended. It is hard to believe that such running of aliens continues. The record discloses that it does in great numbers, and unfortunately with the aid of citizens of the United States. Heavy penalties are prescribed for the violators of custom and immigration laws, and fortunately, the United States has been able to bring to justice recent violators of the statute.

In a case entitled *United States of America v. Motor Vessel F. V. Hill* decided by the United States District Court for the Southern District of Florida, the court appropriately punished the violators of the statute. The facts may be briefly summarized as follows:

The United States of America had seized and proceeded against the Motor Vessel *F. V. Hill* for the alleged violation of the immigration laws. The charge was predicated upon the vessel's arrival at Tampa, Florida from a foreign port, to wit, Georgetown, Grand Cayman, via Cozumel, Mexico, with eight aliens aboard falsely listed on the vessel's manifest as members of the crew. The charge necessarily included the claim that the master had permitted the aliens to land with intent to violate the laws of the United States. He was also charged with falsely and knowingly representing to the immigration authorities at the port of Tampa, Florida that the aliens were bona fide members of the crew.

The vessel had arrived in the port of Tampa at about seven o'clock a. m. on September 2, 1947, with the eight alleged crew members who admitted under examination that they were really passengers and not crew members. They each testified that they had individually paid the master a sum of money to transport them as passengers. In the crew list, over the signature of the master, it was represented that each of the persons found aboard the vessel was a member of the crew. The owners pleaded ignorance and custom. However, the court refused to recognize either of the reasons as a valid defense.

The court fined the master and the vessel owner jointly and severally in the sum of $5,000, and by virtue of the penalty provisions of the section under which they were prosecuted, held the Motor Vessel *F. V. Hill* liable for an additional penalty of $5,000. Failing payment of the aforesaid fine, the vessel was ordered to be sold and the United States paid out of the receipts of the sale.

In passing sentence, the Court said that if the law permitted, it would have preferred to cancel and nullify the citizenship of the master and each and all of the owners who were in privity with the master, in addition to the prescribed fines. The court continued that it regarded the right of citizenship as the most valuable possession of any citizen of the United States, and his efforts to violate the laws that make that citizenship valuable, should be punished by a more stringent penalty than that provided by the statute.

THE LAW CHANGETH

Although the title may not be quite accurate, it does appear from one of the most recent cases handed down by an Eastern court that if the law is not changing, interpretation certainly is with respect to seamen's suits against general agents of the United States.

I have, on occasion, told you of the leading decisions in this particular field which have in almost all cases, given the seaman the right to sue the general agent even though the United States admittedly was the employer at the time of the disability. One of the cases that I have been following with some interest because of the court's indication that a change in interpretation would follow, is *Gaynor v. Agwilines, Inc.*, United States District Court, Eastern District of Pennsylvania. The report that I make to you comes after a rehearing of the court's original determination that no civil action for wages, maintenance and cure and for loss of personal effects can be maintained against the defendant (general agent).

Rehearing was granted at the request of the plaintiff seaman, who asked that the Clarification Act and certain alleged pertinent authorities be reviewed in the light of the fact that by reason of the Pennsylvania court's holding, the rights of seamen employed through the War Shipping Administration would be curtailed.

The general agents have not tried, either in this case or in any of the others, to take away any right that any seaman had to recover for wages, maintenance and cure or loss of personal effects. However, they have insisted from the beginning that they should not be subjected to

suit in their capacity as general agents, but to the contrary, the employer, namely the United States, was and is the only body properly named defendant.

During the acquisition of substantially our entire Merchant Marine by the United States through the War Shipping Administration and its predecessors, a number of legal problems with respect to the rights of the seamen employed to man the vessels were created. These seamen, as expressed by their representatives, desired rights enjoyed by seamen employed on privately owned vessels such as those under the Jones Act as well as the existing bargaining agreements entered into between the private vessel owners and the labor unions in preference to those afforded by Federal statutes enacted for the benefit of government employees. The policy of the War Shipping Administration of attempting to give the seamen employed by it preferred rights was hindered by the fact that they were technically government employees. In this status they could not earn credits toward benefits provided by the Social Security Act while at the same time they were excluded from the benefits of the Civil Service Retirement Act by Executive order. Doubt prevailed since it was thought their rights varied because they were made to depend on the fortuitous relationship of the War Shipping Administration or the nature of the vessels on which they were employed. Thus if the vessel was owned by, or bareboat-chartered to, the War Shipping Administration, the crew became technically employees of the government; on the other hand, if the vessel was time-chartered to the Administration, the crew remained the private employees of the vessel's owner. In addition the exact status of these seamen was further confused when vessels of the Administration were chartered or made available to another department or agency of the United States. Because of the provisions of the Suits in Admiralty Act providing that suits thereunder may be brought only if the ship involved is a merchant vessel or a tugboat, a seaman employed on a public vessel could not sue the United States for damages. As a result, it could not always be determined with any amount of certainty whether a vessel in question was technically a public or a merchant vessel, and as a consequence these seamen were made to rely upon the policy of the Administration for an adjustment of their claims for such injuries.

In 1930 the Supreme Court in *United States Shipping Board Emergency Fleet Corporation vs. Lustgarten* (No. 32), 280 U. S. 320, (discussed in an earlier article) held that a seaman could not recover from the private operator for injuries sustained by him while he was employed on a merchant vessel owned by the United States. The Court based its decision on the rule that the remedies given by the Suits in Admiralty Act were exclusive in all cases where a libel might be filed under it. However on January 18, 1943, in *Brady vs. Roosevelt S. S. Co.*, 317 U. S. 575 (discussed in an earlier article), the Supreme Court, in modifying the broad rule laid down in the *Lustgarten* case, held the Suits in Admiralty Act did not save the private operator working under a general agency agreement from suit to recover damages for injuries sustained by a third person as a result of its negligent operation of a merchant vessel owned by the United States.

On June 8, 1942, Admiralty Rule 46 was amended to prevent the possibility of a case being heard which might reveal information of value to the enemy. No concurrable rule or amendment existed on the civil side of the Federal Court.

It was against this background as it is briefly stated here, that Congress passed the so-called Clarification Act of March 24, 1943 in order to restate, clarify and extend the rights of seamen employed through the War Shipping Administration.

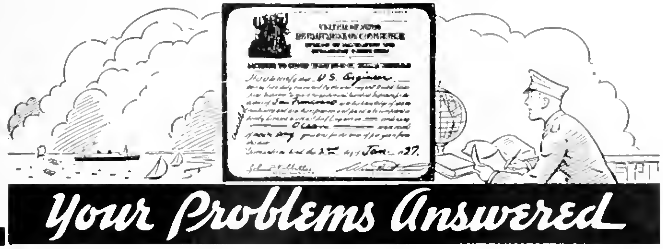
The contention of the plaintiff is that the Act did not change in any way the rights and remedies which these seamen might assert or have against the general agents of the vessels. As a basis for his contention, he relies upon the wording of the Act and *Hust* vs. *Moore-McCormack Lines*, 328 U. S. 707 (discussed in an earlier article), and *Aird* vs. *Weyerhaeuser Steamship Company*, 3 Cir., decided September 16, 1947.

It is true that the Act does not expressly say that the seamen in question cannot bring their actions against the general agents upon the existence or occurrence of the circumstances listed under clauses (2) and (3) of the first section of the Act. However, it seems that the Act, taken as a whole, in connection with its background and the reports of the Senate and House, expresses a clear command by Congress that there be a new remedy, set forth therein, namely, by first presenting the claim to the War Shipping Administration in accordance with the rules and regulations prescribed by it, and then after the claim has been administratively disallowed, by bringing suit on the claim pursuant to the provisions of the Suits in Admiralty Act.

The Court said: "Merely because Congress stated that with respect to those rights listed in clauses (2) and (3) of the first section of the Act, the seamen employed by the War Shipping Administration shall 'have all the rights, benefits, exemptions, privileges and liabilities, under law applicable to citizens of the United States employed as seamen on privately owned and operated American vessels,' it does not follow that Congress meant that they shall have the same remedies. Congress was not haphazard, but careful in the use of terms. The omission of the word 'remedies' was not accidental but intentional. Section 4 of the Act is not an indication that Congress intended that these rights could be enforced against the general agent as heretofore side by side with the new remedy. That section, in part, was intended only to afford the general agent limited protection in the event of the arising of a situation similar to that which arose in *Brady* vs. *Roosevelt S. S. Co.*"

If the interpretation placed upon the Clarification Act by the plaintiff was in fact the intention of Congress, passage of the Act would have been a vain gesture. The cause of action before the Court was one that did not arise prior to the passage of the Act. Therefore, the retroactive provision which would have given the seamen in question an election to sue under its provisions, or pursue his former remedies, is not before this court. There is no election provision for the prospective operation of the Act and the Court refused to read such a provision into

(Please turn to page 104)



by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

"CHALK TALKS" ON APPLIED MATHEMATICS

Blackboard figures 1(a), 1(b) and 2, mentioned in the text.

The Screw

OUR LAST ARTICLE discussed the ability of the screw to lift the weight and the profound effect of friction in lowering the lifting ability. It was shown that on account of friction most of the mechanical advantage of the screw was due to the length of the wrench or lever arm by which the arm was turned. The American Standard angle thread and the square thread were mentioned.

We now have to show that the angle thread, while much stronger in the root than the square thread for any given pitch, adds greatly to the friction and develops a bursting load on the nut. Referring to Fig. 1(a) note the angle of thread sketched to an angle A. If this angle A were 45 degrees the vertical loading shown in the sketch as L could be considered as divided into two components in which the vertical one would be L pounds and the horizontal one H, and these two forces would be equal. H equals L x tan A. The trigonometric func-

tion called the tangent (abbreviated tan) is the side opposite divided by the side adjacent to an angle of the right triangle. See Fig. 2. The values of this function will be found in any mathematical table. As shown in Fig. 1(a) with the angle A at 45 degrees the vertical side L equals the base H; with the angle A zero the base H becomes zero in length, and with the angle A equal to 90 degrees the value of H becomes of infinite length. These are exactly the changes in values of the horizontal force on the nut with the changes in the angle of the thread. With the square thread, (angle A equals zero) Fig. 1 (b), there is no horizontal or bursting force on the nut.

Also note that the force between the surface of the thread of the screw and that of the nut called R in the Fig. 1 increases rapidly with the increase in the value of the angle A. Again from trigonometry, the cosine of angle A (cos A) equals L/R from which we derive that R equals L/cos A. See Fig. 1 (a). As A increases the cos A decreases; therefore the resultant R increases.

The Marine Engineer must not be alarmed at the use of these trigonometric functions. They are only the fractions or ratios of the sides of any right triangle. For instance, taking the triangle in Fig 1 (a) as an example, as the angle A increases from zero to 90 degrees and as angle B therefore decreases from 90 degrees to zero, the following changes in these ratios are true.

Sin A equals Cos B equals H/R. Varies from zero to 1. At 45 deg. is equal to .707.

Cos A equals Sin B equals L/R. Varies from 1 to zero. At 45 deg. is equal to .707.

Tan A equals H/L. Varies from zero to infinite. At 45 deg. is equal to 1.00.

Tan B equals L/H equals 1/Tan A. Varies from infinite to zero. At 45 deg. equals 1.00.

Thus increasing the thread angle A not only increases the bursting force on the nut but also increases the surface pressure and therefore the friction. If a square thread is used and well lubricated, there will be insufficient friction to hold the nut from turning when the torque or wrench is removed. This is the type of thread which would be used on a screw jack as it has maximum mechanical advantage, maximum efficiency but minimum thread strength and is likely to unturn due to the load if not held. The square thread will usually be found on mechanisms which have a running thread in which the screw spins, chasing the nut back and forth for positioning. Control and follow-up mechanisms might use this thread.

But for heavy loading such as bolting turbine casings, or steam and water pipe flanges, the American Standard angle thread is used. Here the greater thread strength and self locking features of the angle thread are preferred. Angle A is usually 30 degrees which gives a thread angle of 60 degrees.

The Marine Engineering Regulations and the Coast Guard requirements, Section 51.16 very specifically covers the composition, heat treatment, hardness and tensile properties of the steel for bolts and nuts. These requirements cover three grades of steel ranging from a tensile strength of 95,000 to 125,000 pounds per square inch. Contrast this with the steel for boiler shells which may run from 50,000 to 65,000 lbs. per square inch. Then for temperatures above 500 degrees the maximum allowable stress due to the steam or water pressure shall not exceed 6,000 lbs. per square inch for bolts less than 7/8 inch diameter, and 7,000 lbs. per square inch for bolts 7/8 inch diameter or larger. Note the great factor of safety of about 20 to 1 used. This is necessary to allow for a great load on the bolt, setting it up tight even without steam or water pressure. The increase in temperature may apply additional strain on the bolt due to expansion. The effect of temperature and expansion on the loading of a bolt together with calculations of stress will be discussed in our next article. In calculating the area of a bolt its diameter is taken as that of the smallest part which is the root of the thread.

Very careful specification of chemical composition, fabrication, stress-relieving and hardness of the material for making the nuts is included in the Coast Guard Regulations. For instance, the stripping test which nuts of all classes must be able to meet consists of the assembly of a nut on a bolt in a tension testing machine. Load is then applied and the nut shall not strip the threads when a specified stress in lbs. per square inch load is applied to the bolt, where the area is figured from the mean diameter of the bolt.

To make sure that the nuts will withstand the bursting force discussed above, a drift test is specified in the Coast Guard regulations, for temperatures at 850 degrees and over. A specimen nut all finished and threaded is forced on to a tapered drift pin or conical mandrel, part of which has a diameter equal to the nominal nut size. This is done cold and the nut must not crack.

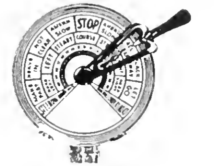
Our last article developed the relation that the larger the pitch of the threads the more load could be lifted with the screw. (Pitch is the number of threads per inch of screw). It would appear that the larger the screw the larger the pitch and the smaller the threads, which would be desirable to carry the greater loads of larger screws. But this is not the case except that the large bolts of 4 to 6 inches do not have large threads proportional to the size. Threads must be made larger for larger screws because of the bursting force and the stretch of the nut. The same per cent stretch of a 2 inch nut is twice as much as on a 1 inch nut. The thread must be made larger so that this increased stretch does not concentrate the load on the surface of the thread. The increased load of larger screws is obtained from an increased length of lever or wrench. Very large nuts may use a short, heavy wrench on which a heavy hammer may be used.

Fig. 2 is a tabulation of the simple trigonometrical functions or ratios for the benefit of those who want to study this further. Notice that it is sufficient to remember the sine only as the cosine can be derived, and to associate these angles and numbers: 0-0, 30 deg. .500, 45 deg. .707, 60 deg. .866, 90 deg. 1.00. and tan 0 is 0, tan 45 deg. is 1 and finally, tan 90 deg. is infinity.

Our next article will discuss the temperature effect on bolts.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

"WHERE AM I?"

A NAVIGATOR who would ask such a question immediately after making observations of several stars when conditions for observations were apparently good would in all probability be laughed off of the bridge and surely would be pegged as an inefficient navigator by many ship's officers. Yet such a question might be asked in all sincerity by an honest and efficient navigator without reflection upon his navigational ability.

A certain conscientious young navigator of my acquaintance made a similar statement to the captain of his vessel one evening after carefully checking his sextant for any Index error and checking and rechecking his work and his plotting on two sets of star sights. The evening was apparently ideal for observations. The horizon was clear and distinct, the sky cloudless and without haze. There was no wind and the vessel was steady. His instrument had no Index error yet the stars would not plot. That is, the lines of position would not cross in such a manner as to give a decent fix. He could have been at any one of six or eight possible positions. Why wouldn't these lines of position cross so as to give him an accurate determination of his position? This young navigator began to wonder if his eyes were failing him, or, if not, if his instrument, of which he was justly proud, had some undetected error in it. All in all he was a rather frustrated young man when he confronted the captain and admitted he did not know exactly where the vessel was.

In all probability many readers have had similar experiences under much the same circumstances and conditions and can appreciate his embarrassment while making this confession to the captain. Since the vessel was well away from any land and a good fix had been obtained that morning and at noon, the captain, who doubtless had in the past had many such experiences, brushed it off lightly and remarked, "Sometimes these horizons fool you," and as far as he was concerned the matter was forgotten. Not so with the young navigator for he had much the same experience the next evening when conditions were about the same.

The next evening when conditions for observations were apparently not nearly so good this same navigator with the same instrument using several of the same stars got a perfect castwheel for a fix. Why?

The reason for the inaccuracy of his lines of position might have been due to any one of, or a combination of several factors which can at times cause our celestial navigation to be less than the exact science that we would like it to be. Just to mention and discuss a couple of these factors which contribute to the inaccuracy of our celestial navigation let us first take up the observer. First, we might ask, was this observer in good physical condition at the time of these inaccuracies? Physical fatigue can and does have an effect on observations. Illness also can affect them. If our answer be "yes" to this first question then a second might be, was the observer affected by mental strain or fatigue? It has been found by experiments of astronomers that either physical or mental fatigue can and does generally affect observations. Next, was the observer standing in a strained position while making his observations? Was he rushed for time, his horizon fading, time to go off watch or some other work he was anxious to do so that he rushed the taking of the sights? Had something happened to disturb his nervous system? The physiological makeup of a man is such that at times certain disturbing factors could cause errors in his observations which would be unknown to anyone. Then what of the possibility of the human element, we might call it, whereby slight errors can be made for no apparent reason?

While considering personalities we might dwell on this for a moment. I'm sure all navigators have experienc-

(Please turn to page 89)

On the Ways

New Construction—Reconditioning—Repairs

Two Moran tugs help the converted T-2 tanker, ARDESHIR, nose around the outside of Todd's Brooklyn shipyard, where she was converted for the French Merchant Marine Mission, which purchased her on April 23rd from the U. S. Maritime Commission.

T-2 Tanker Converted For French By Todd

TODD SHIPYARDS CORPORATION, Brooklyn Division, completed the conversion of the T-2 tanker, *Ardeshir*, formerly the *Rainier*, for the French Merchant Marine Mission, on May 13. This is one of a group of T-2's purchased from the U. S. Maritime Commission by the French Mission, five of which were awarded to Todd yards for conversion. The *Esso Normandie* was recently completed at the Hoboken Division; the Los Angeles Division is now working on the *Grand Teton* and *Coulee Dam*, and the Seattle Division on the *Donner Lake*.

During the six-weeks conversion of the *Ardeshir*, Simpson-Spence & Young, of New York, acted as agents.

(Please turn to page 108)

The forward side of the new salon, showing two additional settees, and two mess tables with light walnut trimming and green linoleum tops. They are joined in a drop leaf, to provide one long table seating twelve persons. Note the fluorescent lighting fixtures, of which there are three in the room, and the three-speed electric fan.

Interior view of one corner of the modern officers' salon, built in a former gunners' crew room. The bulkheads are paneled in light walnut, the same wood of which the leather-upholstered chairs and handsome serving buffet are made. The settees and comfortable easy chair are covered with genuine green leather.

The T-2 tanker, NORTHFIELD, shown on drydock at Bethlehem's San Francisco Yard.

Oil to Molasses

In what represents the only job of its type to be performed on the Pacific Coast, the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division, is now converting a T-2 tanker, the *Northfield,* into a molasses carrier for Paco Tankers, Inc., of Philadelphia, Pennsylvania. The *Northfield* is 503′ long, of 10,448 gross tons and has a capacity of approximately 135,000 bbls. Her routes have not yet been determined.

Built at Swan Island Shipyard in 1943, the *Northfield* was operated in the Pacific during the war by Union Oil. In August, 1945, the vessel suffered grounding damage and was laid up at Marinship in Sausalito. In May of 1947, she was drydocked at Bethlehem's San Francisco Yard for survey and prepared for lay-up at Suisun Bay.

Now on drydock at the San Francisco Yard, following removal from lay-up, the *Northfield's* bottom damage is being repaired with renewal of 150,000 lbs. of new plates. Extensive interior hull stiffening is being performed to give the vessel additional strength to carry molasses which is considerably heavier than oil (molasses weighs around 88 lbs. per cubic foot). In addition, four "straps" or crack arrestors are being installed, two on the deck and two on the bottom.

Extensive modifications are being made to the after pump room to accommodate a new pump. Machinery repairs are also being made to bring the vessel into classification. The vessel is being equipped with all the latest aids to navigation, including radar and automatic pilot.

Keystone Shipping Company are acting as agents for the *Northfield,* which has been purchased by Paco from the U. S. Maritime Commission.

Bethlehem's Alameda Yard Busy

The Alameda Yard of Bethlehem Steel Company, Shipbuilding Division, is currently repairing or converting eleven vessels. This volume of work is approximately two-thirds World War II level, and represents the largest number of vessels in the yard at one time in over a year. This figure does not include work recently performed by the yard on three other vessels at the Oakland waterfront. Employment at the yard is the highest since early last year.

There are two tugs on the yard's 3,500-ton floating drydock for routine repairs; two former Navy tankers being converted for commercial use; three U. S. Army Transport utility boats undergoing engine overhaul and general repairs; two 63-foot Army Picket boats being repaired; one former Army mine layer and one commercial cargo vessel undergoing routine repairs.

A section of Bethlehem's Alameda Yard showing several of the vessels currently undergoing repair or conversion.

Glenn Gulvin

Port Engineer of the Month

LOS ANGELES

Glenn G. Gulvin

Of American Pacific Steamship Company

On the Coast Guard Cutter *McCullough*, sunk in June 1917 (rammed by the *SS Governor* off Point Aguello)—on the *Agwi-World*, fired on (and missed) by a Japanese submarine December 20, 1941 off Monterey Bay—on the *Mission Rafael*, which was chased twice by German submarines—Glenn Gulvin has had his share of harrowing sea experiences.

He joined the Coast Guard in 1915, obtained his original license and started sailing in 1918. In 1922 he came ashore and worked in machine shops and experimental laboratories until 1925 when he began work in the oil fields on construction and maintenance jobs. He continued in that work for ten years and finally returned to sea in 1935, sailing on ships of Weyerhaeuser Steamship Company, General Petroleum and Richfield Oil.

Glenn began working for American Pacific in January 1944. He was on the first T-2 Mission type tanker for the company. Assigned to the engineering staff of American Pacific in 1945, he is now Supervising Engineer.

Glenn has sailed under Al Ownes, Richfield Oil Chief Engineer, as First Assistant, and under Chief Engineer Petit of General Petroleum as Second Assistant.

Hunting and fishing are his favorite sparetime pursuits.

--With The

Los Angeles Meeting

At the June 2 meeting of the Port Engineers Society of Los Angeles-Long Beach, the Craig Shipbuilding Company entertained the group with a showing of the Fireman's Fund Insurance Company's sound and color picture of the salvage of the steamer *Diamond Knot*. The epic salvage operation performed on this vessel was described in an illustrated article in the April issue of PACIFIC MARINE REVIEW.

At the meeting John Marriner represented Craig's. Special guests were Miss Barbara Watson (*the* Miss Watson) and Frank Smith of American Mail Line. Miss Watson broke precedent in being the first woman to attend a meeting of the society. Frank Smith is a former president and one of the founders of the San Francisco society.

Barbara E. Watson, San Francisco Manager of American Mail Line, a Port Engineers Society visitor.

Port Engineers-

Fred P. Ritchie started his career as an oiler in the Army Transport Service out of Newport News, Virginia, in December 1906, the period of the Army occupation of Cuba. He remained in this service until 1909. From there he went to work in the marine shops of the Maryland Steel Company, Sparrows Point, Maryland, where the American-Hawaiian ships *Kentuckian*, *Georgian* and *Honolulan* were being built.

He came through the shops with the *Kentuckian's* engines and joined American-Hawaiian Steamship Company as an oiler when the *Kentuckian* was delivered about the end of May 1910. Fred remained on various vessels of American-Hawaiian until World War I in the capacities of Third Assistant, Second Assistant and First Assistant.

During World War I he served as Chief Engineer in the United States Navy on the monitor *Ozark* and the destroyer *Woolsey*, a four-stacker out of Bath, Maine. Then he returned to American-Hawaiian as Assistant Port Engineer at New York, and was transferred to San Francisco in the same capacity in August 1923. He was appointed Superintending Engineer in May 1940 and in November 1942 was appointed Pacific Superintending Engineer at San Francisco.

Port Engineer of the Month

SAN FRANCISCO

Fred P. Ritchie

Of American Hawaiian Steamship Company

Fred Ritchie

Meters and Control For Marine Power Plants*

By V. A. RUMBLE, Bailey Meter Company

V. A. Rumble, speaker at the June meeting of the Society of Port Engineers (left) and his assistant, P. M. Harris.

THE PURPOSE OF THIS PAPER is to discuss the control of marine boilers, and particularly the use of various devices for improving the responsiveness and efficiency of steam generating units and their auxiliaries aboard ship.

Benefits Derived from Meters and Control

The following benefits can be expected through the intelligent use of meters and automatic controls in marine power plants:

1. Simplified operation and more efficient use of personnel.
2. Fuel economy.
3. Increased life of furnaces and auxiliaries.
4. Improved engine efficiency through closer regulation of steam pressure and steam temperature conditions.
5. Less smoke.

1. *Simplified Operation:* There are a number of functions in the operation of the boiler plant which require experience and dependability without needing great skill. Such functions as regulation of steam pressure, regulation of feedwater to maintain drum level, regulation of fuel-air ratio, regulation of steam temperature where means are provided and regulation of various other water and oil temperatures require continual vigilance on the part of the operators. While no claim is made that these functions can be done better with automatic devices than by a man who is constantly on the job and provided with centralized controls and sufficient instruments for his guidance, the use of automatic devices to perform such duties releases such men for general supervision. Thus the operators have time to become completely familiar with and maintain a perspective of all of the apparatus in the plant, and through greater familiarity and greater watchfulness are able to detect faulty performance of major and auxiliary apparatus before shutdowns occur.

Suitable metering and control equipment permits balancing of loads between boiler units so that the most economical operation and longer life are assured.

2. *Fuel Economy:* One of the most common losses in the operation of boiler plants is that due to improper maintenance of the fuel-air relation. For each furnace and fuel there is one best relation between the fuel

(Please turn to page 68)

*Based on an illustrated address before the San Francisco Society of Port Engineers June 2.

Fig. 1. Combustion Control and Feedwater Regulators as applied to U. S. Maritime Commission Vessels.

Fig. 2. Arrangement of Meters and Control for a Turbo-Electric Tanker.

Fig. 3. Curves illustrating heat loss in flue gases and flue gas analysis vs. per cent total air.

Fig. 4. Thermo-Hydraulic Feedwater Regulator Self-actuating single-element type.

Fig. 5. Pilot-operated single-element feedwater control.

Fig. 6. Three-element feedwater control Air-operated type.

Fig. 7. Pressure reducing and desuperheating control system.

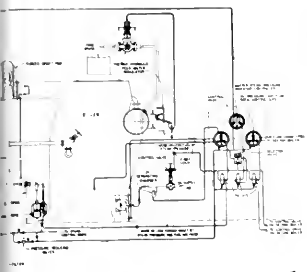
Fig. 8. Electronically-operated area meter for measurement of fuel oil flow.

Fig. A. Master Steam Pressure Controller. Used as index of relation between incoming and outgoing energy.

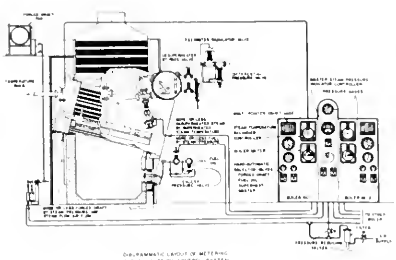
Fig. B. Hand-Automatic Selector Valve. Allows for smooth transfer from automatic to remote manual control.

Fig. C. Fuel-Air Ratio Controller. Automatically maintains the correct fuel-combustion air ratio for all rates of firing.

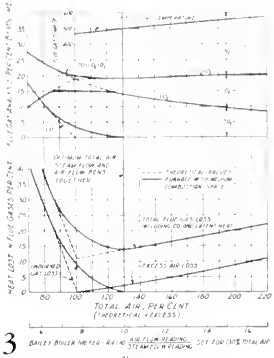
Fig. D. Air-Operated Control Drive. Regulating device for actuating valves, dampers, etc.



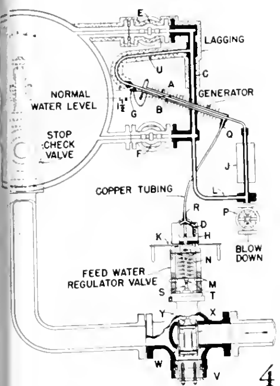
1



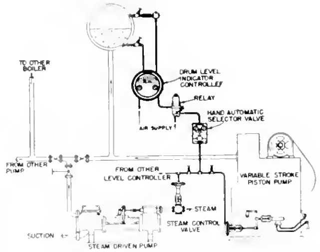
2



3

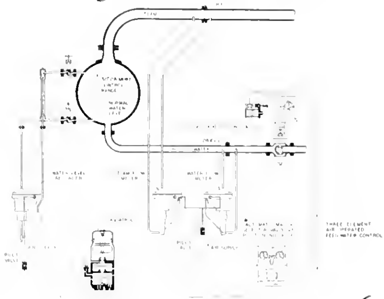


4

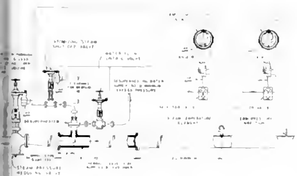


SINGLE ELEMENT BOILER FEED WATER CONTROL FOR VARIABLE STROKE PISTON PUMPS

5

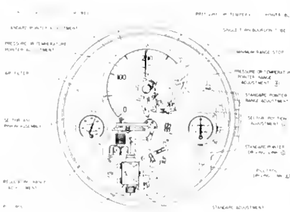


6

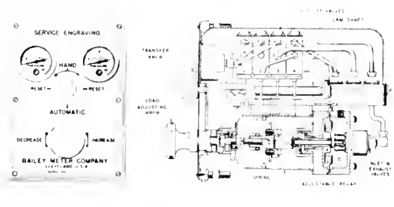


BAILEY PRESSURE REDUCING & DESUPERHEATING SYSTEM FOR HORIZONTAL OR VERTICAL INSTALLATION

7

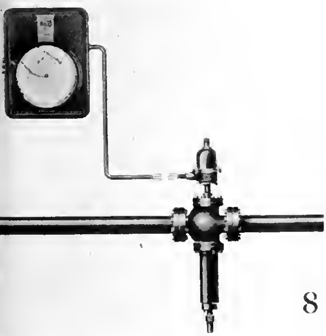


A



BAILEY SELECTOR VALVE

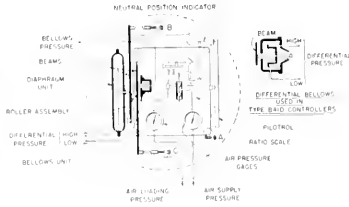
B

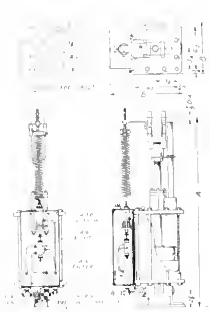


8

RATIO CONTROLLERS TYPES B41B AND B41D

GENERAL DESCRIPTION AND PRINCIPLE OF OPERATION





C

Meters and Control

(Continued from page 66)

burned and the air supplied for combustion. When air in excess of the proper requirement is supplied, fuel is wasted as a result of the heat carried away in the excess air (see Figure 3), and this loss will average 1 per cent of the total fuel burned for each 10 per cent of air supplied in excess of requirements. There is still a greater loss when less than the required amount of aid is supplied for combustion, and this may be as high as 10 to 15 per cent of the fuel wasted for each 10 per cent deficiency of the air supply.

Without suitable metering or automatic control devices it is practically impossible for the boiler operators to maintain continuously the correct fuel-air relation. A conservative estimate of fuel saving through the use of meters and automatic combustion control on average modern steam boilers is from 2 to 4 per cent, and in many cases even greater savings are possible in plants where the operating personnel is inexperienced or lacking in vigilance.

3. *Increased Furnace Life:* A saving perhaps equal to that of fuel conservation is possible through the use of meters and automatic combustion control due to increased life of refractory boiler furnaces. Proper regulation of the fuel-air ratio is a very important factor in getting the most life out of such furnaces.

Regular cleaning and inspection of the oil burners likewise has much to do with furnace life, and regular inspection of the boiler auxiliaries is very helpful in getting the maximum possible service from these units. If the operators are relieved from the routine duties of maintaining steam pressure, fuel-air ratio, drum level, etc., many other all-important functions should be performed with greater regularity and care.

4. *Improved Engine Efficiency:* Considerable gain in overall economy is available in the average marine power plant through more accurate regulation of the steam pressure and temperature. Since design limitations prevent operation at pressures and temperatures in excess of design conditions, the usual tendency is to operate at a safe point well below these values. With automatic regulation of steam pressure and of steam temperature where facilities for controlling temperature are available, the constant vigilance and greater speed of operation of the automatic control permit the pressure and temperature conditions to be maintained at standard values without danger of exceeding these conditions appreciably even while maneuvering the ship.

Since the overall heat rate of a turbine plant operating at 450 pounds and 750 degrees F. will be reduced approximately ½ per cent for each 25-pound reduction in steam pressure and 1 per cent for each 25-degree reduction in steam temperature, the advantage of maintaining steam conditions near the design value is obvious. Furthermore, maximum capacity of the plant may be reduced in direct proportion to the reduction in steam pressure if a low standard is maintained.

As steam pressures and temperatures increase, the need for careful regulation becomes more important, as the hazard of exceeding design conditions is greater and the losses in efficiency due to operating below design conditions are more pronounced.

5. *Less Smoke:* Close fuel and air proportioning will eliminate the smoke, particularly while the ship is being maneuvered. In times of war this is of greatest importance. In times of peace absence of smoke is also important in keeping the ship clean and in reducing the amount of fouling in the convection heating surfaces of the boiler.

Metering and Control Devices Available for Marine Work

Combustion Control: The method used in governing a steam boiler is not radically different from that of governing a steam engine or turbine. Steam pressure is used as the index of the relation between incoming and outgoing energy instead of speed as in the case of the engine. There are two important differences however. Instead of having only one factor to be controlled, there are at least three factors: namely, fuel, air and water supply; and these must not only be controlled to satisfy the demand, but the relation between fuel and air must be accurately maintained at all times, and the correct amount of water must be kept in the boiler. Second, the various regulating devices for the fuel, air and water supplies are not concentrated at one point, so that means for remote operation of these devices are necessary in order that the control can be centralized.

Compressed air is used as the actuating medium for most marine combustion controls, principally because of the simplicity of the control equipment required for the necessary accuracy and speed and because there is no fire hazard involved in running compressed air lines to the various devices situated in different parts of the fire room.

Most combustion control systems consist of the following parts which are combined in various ways to satisfy each particular plant layout:

1. Master steam pressure controller, Fig. A.
2. Selector stations for remote hand or automatic control, Fig. B.
3. Fuel-air ratio controller, Fig. C.
4. Power devices such as piston operators or diaphragm motors for actuating valves, dampers, etc., Fig. D.

There is no fixed rule for connecting up these various devices, as the type of boiler and furnace, type of fuel burning equipment, arrangement of the fuel and combustion air supply systems determine which arrangement best suits the particular plant. Four arrangements often used are as follows:

1. Series control. Steam pressure adjusts fuel rate. Measured indication of fuel rate establishes a metered air flow.

2. Series control. Steam pressure adjusts combustion air flow. Measured indication of air flow establishes metered fuel flow.

3. Parallel-series control. Steam pressure adjusts fuel rate and combustion air flow simultaneously. Metering type fuel flow-air flow ratio controller readjusts the fuel flow.

4. Parallel-series control. Steam pressure adjusts fuel rate and combustion air flow simultaneously. Metering

(Please turn to page 84)

Running Lights

GOVERNOR
EARL
WARREN

•

(See page 70)

Earl Warren—Friend of Merchant Marine

Governor Warren of California, on whom the national spotlight has suddenly been directed, is decidedly Merchant Marine minded. His speeches and conversations reflect a constructive interest in shipping. For instance:

"No one could live on the Pacific seaboard as I have throughout my entire life, watching the ships of the world enter and leave our ports, without developing a strong personal interest in both the past and the future welfare of the merchant marine and the great shipping industry. It is by heritage an industry that is an integral part of America's western empire."

"With these millions of people coming to our coast, we must not permit it to become a dead end of American civilization. From all the great ports between San Diego and Puget Sound we must expand our free activities into the great Pacific Basin and the continents which lie beyond."

"Such comprehensive legislation as the Merchant Marine Act and the direct subsidy program should have established our shipbuilding industry in a supreme position throughout the world."

"Preparedness itself is a significant means of prevention. No appraisal of American Merchant Marine requirements for the future can safely be made that does not give consideration to that factor. America was unprepared before 1917. America was unprepared before 1941. A third failure would be both inexcusable and disastrous to the people of this nation and to the people of the world."

"It is well for us to remember that a well-balanced merchant marine program is a peacetime facility as vital to the industrial welfare of our Nation as it is a wartime requirement."

"America must have the business sagacity today to develop a shipping industry which tomorrow can make an honorable bid for its share of the world's commerce. Such a course of action does not mean building momentarily a lot of ships and then putting them away in storage for future use. Rather it means the construction of improved yards and docks as well as the maintenance of a large working force of skilled pipe fitters, machinists, riveters, welders, electricians, steel workers, joiners, and sheet metal workers, as well as executives and management, all of whom are developing an improved knowhow day by day."

"There can be no justification—no excuse for allowing our merchant marine and our maritime position to deteriorate."

"With our added responsibilities and new commitments resulting from World War II—with the start we got in our big shipbuilding plants—with our greater understanding of world affairs . . ."

"The merchant marine is an industry that is vital to the rounded development of our national interests. It is axiomatic that if we put our ships and plants in moth balls, we are killing our industry. Industry cannot be stored away for future use. It must be kept alive, growing, and competitive."

"Nor must we stop here in preparing our blueprint for the shipping industry of tomorrow. There is no doubt in my mind but that this nation's exports are to expand far beyond the ten per cent of our production that normally has been shipped abroad. Exports of the future must mean far more than a handy way of disposing of American surplus left over after domestic demand is satisfied. They must mean an ever-expanding program of commerce with the countries of the world."

"Just the other day I went on a shakedown cruise on the *President Wilson*. I thrilled over the beauty and operation of that ship as I did only a few months ago when I was aboard the *President Cleveland*. I was somewhat saddened, however, when I was told that there are only twenty-six passenger ships now afloat, as compared to 162 before the war."

"I could not help feeling that everyone who believes in the future of this city, this State, this great country of ours, must recognize that we must do what we can to hasten the day when those docks will be crowded in peacetime as they were during the late war. Many of them must also be American ships engaged in both domestic and foreign trade. Nothing less than this is worthy of the great harbor of San Francisco or the maritime standing of our country throughout the world."

Book Review

SHIPBUILDING AND MARINE ENGINEERING IN GERMANY DURING 1939-1945, published for the British Intelligence Objectives Sub-Committee by His Majesty's Stationery Office, London. Twenty pages, 20 cents, at British Information Services, New York City or San Francisco.

Prepared by F. J. C. Jacob, staff member of the British Shipbuilding Research Association, this booklet is a report covering the ship construction program in Germany during the war, including both Naval and Merchant ships. One section of the booklet is devoted to boilers and steam propulsion with emphasis on the various problems encountered in boiler installation. In the description of internal combustion engines mention is also made of the testing methods which the Germans developed for their use. Research carried out on gas turbines is described briefly. Other sections deal with power transmission, steering devices, auxiliary machinery and equipment, and cargo handling and windlasses.

Reilly Elected Todd President for Seventeenth Year

At a recent meeting of the board of directors of Todd Shipyards Corporation, John D. Reilly was elected president for the seventeenth year.

Reilly was associated with the Robins Dry Dock and Repair Company from 1907 to 1916 when the Todd organization was incorporated and took over the properties of the Robins Company. He was elected president of Todd in 1932 when Mr. Todd died.

Under his guidance, Todd Shipyards Corporation continued the expansion program it began in World War I. It now has seven divisions for operating shipyards and one for the manufacture of combustion equipment, as well as eight subsidiaries and affiliates for other shipyard and manufacturing enterprises in the United States, South America, and England.

John D. Reilly

At The Bilge Club Barbecue at Los Angeles

The Barbecue reception committee. Left to right: Floyd Nelson, Bob Snodgrass, Fred Archibald, Theo Peters, Capt. Ed Kellenberger, Comdr. W. M. Mason.

Abalone fixin'.

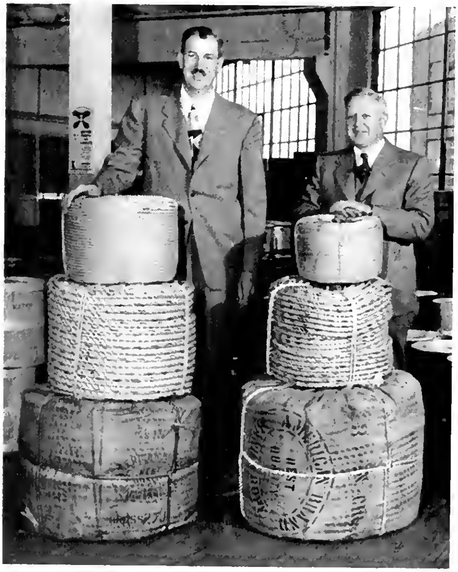
Herwig of Marine Service

One of the Pacific Coast's outstanding marine service companies, Marine Service, Inc., of Seattle, has been appointed distributor in the Northwest area for marine and fishing ropes made by the American Manufacturing Company of Brooklyn, New York.

Quentin Herwig, the six-foot, eight-inch president of Marine Service, is one of the well known waterfront characters of Seattle. He is active in the promotion of maritime affairs and gives much of his time to focusing attention on shipping problems as they affect the Pacific Coast.

Recently Herwig appeared as "Lieut. Peter Puget" in a marine pageant climaxing World Trade Week in Seattle, May 15 through May 22. He was a colorful and striking figure as he landed from the fabled "longboat", a replica of the landing from the old ship *Discovery* skippered by Captain Vancouver in the discovery of Puget Sound 156 years ago. He was met by J. C. Eddy, 300-pound replica of the mythical Paul Bunyan and a group of beauteous candidates in the "Miss Washington" contest.

Quentin Herwig, president of Marine Service, Inc., (left) and Henry Anderson, secretary, pose with samples of American Manufacturing Company marine and fishing ropes. Coils displayed are 7-16, one-inch and one and one-half inch American Brand cordage.



J. C. Eddy (left) impersonates the mythical Paul Bunyan as he greets Quentin Herwig, playing the role of "Lieut. Peter Puget." (See story.)

Radars Purchased by Atlantic Refining Company

Twenty-one Mariners Pathfinder radars, made by Raytheon Manufacturing Company, Waltham, Mass., have been ordered by The Atlantic Refining Company, Philadelphia. This is one of the largest single purchases of commercial radar equipmet yet made.

Raytheon's initial installation was on the tanker S. S. *Atlantic Mariner*. This new 560-foot vessel broke all records on its maiden voyage from Corpus Christi, Texas, to Fort Mifflin, Philadelphia averaging 16.33 knots in hauling 6,000,000 gallons of oil in four days, 18 hours and 55 minutes. The oil company's fastest vessels usually take five days for such a run.

At the time, Captain Preston I. Williamson, master of the ship said "the magic eye" of the surface search radar on the bridge helped to make this speed possible. The *Atlantic Mariner*, he explained, could maintain speed

Initial installation of Raytheon's Mariners Pathfinder radar aboard S. S. ATLANTIC MARINER with Captain Marius Nelson of the Atlantic Refining Company fleet.

Photo courtesy of Raytheon Photo

in fog, rain and bad visibility because of the protection offered by radar.

Captain C. J. Hahs, Port Captain for The Atlantic Refining Company, said the company estimates any delay in a tanker voyage costs $100 an hour and the time saved by radar—which allows full speed in bad visibility—results in a great saving.

The 21 Raytheon equipments are of the 10 cm type for oceanic use and will be provided with the new 12-foot antenna reflector. This large reflector gives the definition usually obtained with the 3 cm system while retaining the all-weather dependability of 10 cm systems.

Among other oil companies that have recently ordered Raytheon Mariners Pathfinders for their tankers are Keystone Shipping Company (13 units) and Sun Oil Company (11 units).

Bethlehem Appoints Zucco

Gaetan M. Zucco

Gaetan M. Zucco of Seattle, has just been appointed Contracting Manager for Bethlehem Pacific Coast Steel Corporation, Fabricated Steel Construction Division, in the four Northwest states. Zucco has been with the Bethlehem organization in the Northwest continuously since 1927, except for the four years he served with the Army Engineer Corps in the Pacific.

A graduate in civil engineering from Stanford University, Zucco has specialized in engineering and design work on many types of steel structures in the Northwest, including bridges, buildings, dams, docks, sea walls, etc. He is a registered professional engineer in civil and structural engineering in the State of Washington and past president of the Seattle Engineer's Club.

The New Portland Dock

The recent flood in Portland really brought the marine trade right to the door as the above picture proves. The water was approximately 2½ feet around the building and it was possible to bring boats to the door. An elaborate system of sandbags formed a dike about two feet away from the building walls and all water was kept out of the building by the use of pumps. This was the only building in the area which succeeded in keeping out the water.

Steelcraft

One of the toughest, strongest, lightweight boats afloat —Steelcraft—is being made from Jones & Laughlin Steel Corporation's special high strength, corrosion resistant, Otiscoloy steel. The use of Otiscoloy has saved 12 per cent of the weight of the boat, and the hull is still nearly 20 per cent stronger than the former gauge of carbon steel. The 26-footer weights 1.6 tons and because of this light weight gets better motor performance.

The use of Otiscoloy high tensile steel has enabled production of a boat of lighter weight and greater strength than a boat made of mild carbon steel, because a given gauge of Otiscoloy is said to be 40 per cent stronger than the same gauge of mild steel.

The following are a few of the incidents testifying to the sturdiness of Steelcraft. In a large dry dock fire, every wooden boat in the yard was destroyed by the flames—except the Steelcraft hulls which remained intact. During the Florida hurricane, a boat shed collapsed on a number of boats which were being stored. All of the wooden boats were smashed but the Steelcrafts were unharmed.

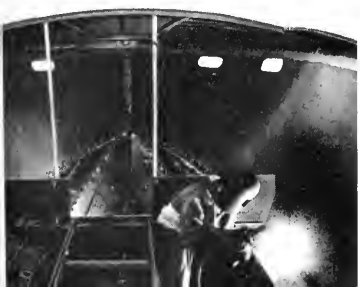
The Steelcraft has greatly reduced maintenance costs for small work boats. It requires less interior strutting, and therefore has more usable space inside than other 26 foot boats.

Steelcraft are sprayed with vinylast, a tough plastic base paint. The life of this paint has been increased 20 to 80 per cent by the corrosion resisting properties of Otiscoloy. Otiscoloy also gives Steelcraft longer life because of its greater resistance to corrosion than ordinary mild steel, and its great superiority over wood in that it will not rot or deteriorate.

Steelcraft cruise at speeds up to 40 miles per hour depending upon the model. The light weight obtainable through use of Otiscoloy high tensile steel contributes to better motor performance.

Jack Churchward is shown here inspecting a finished cruiser after it has left the production line. The use of Otiscoloy has enabled Churchward and Company, Inc. to apply mass production techniques to the manufacture of steel pleasure craft and work boats.

hull of Steelcraft is made of Otiscoloy
-ts which are welded into position, providing
ıter strength and unusual interior roominess
ıe lightweight craft.



To demonstrate the strength of Steelcraft hulls, a Steelcraft cruiser was lifted 106 feet over the bay at New Haven, Connecticut (pictured at the right) and dropped on the water. The ship was unscathed by her plunge. Otiscoloy has a minimum yield point of 50,000 lbs. per square inch as compared to 30,000 lbs. per square inch for mild steel and appreciably less for wood.

rmy Transport Service and Shipping

(Continued from page 29)

here are many islands that will be manned by military etachments and ships must periodically call at these ases with supplies. Some of these bases are located on slands that were unknown before the war but now are y-words of the American people. These include Iwo ima, Kwajalein, Tarawa, Marcus Island, Saipan, Bonin slands, Christmas Island and many others.

Another of the specialized services that must be furnished is the movement of organized troop units such s task forces to various parts of the world. Commercial hips are not constructed to provide the necessary accommodations for such a troop movement and its attendant argo load, but the Army fleet will be capable of transporting such forces at any time. Also, the Army fleet will have vessels that will be capable of transporting bulky nd unusual types of cargo such as aircraft and tanks. The task of transporting patients from all parts of the world to the United States will be accomplished by the ise of Hospital Ships that are components of the Army leet. In supplying the many military detachments, refrigerated cargo ships will be required and provided for within the Army fleet.

Repair Work to Be In Private Yards

During peace, the repairs to the Army transports are accomplished in a manner paralleling that utilized by private operators. While some small amount of repair work is accomplished in marine repair shops operated by the Department of the Army or in Navy Yards, the bulk of such work is obtained through commercially operated ship repair and building yards. In general, the work given to shipyards is awarded on the basis of informal bidding on specifications prepared by the Department of the Army. No unusual problems are encountered n this procedure. The work accomplished generally follows a pattern used by private ship operators, and in the future all work on vessels of the Army transport fleet will be accomplished to meet not only Department of the Army standards but also requirements of the U. S. Coast Guard Vessel Inspection and the American Bureau of Shipping rules. Such additional inspection assures the Department of the Army of an independent check upon the seaworthiness and condition of its vessels. Private shipyards shortly become familiar with the peculiar requirements of the Army transport fleet and such familiarity is of immeasurable assistance during the rush days of war. However, the volume of work so distributed by the Department of the Army during peace years cannot maintain the number of shipyards required to form the nucleus of the ship repairing industry in times of war. The additional amount of work required to support this vital industry for its wartime task must, in a large measure, come from the steady building and maintenance of a strong American Merchant Marine.

During war years, however, the problem reverses itself and it is no longer a question of providing sufficient work to keep ship repair facilities alive. Rather it is a question of finding sufficient ship repair facilities to accomplish all needed work. It is at this time that a vital, energetic ship repair industry strengthened through wholesome development during the peace years, proves itself of immeasurable value. The work load then consists of repairs not only on ships of the peacetime Merchant Marine, the Army and Navy fleets but also on those same fleets tremendously increased by the requirements of war.

Furthermore, the repair industry at that time is faced with additional loads in the form of conversions, installation of wartime protective and defensive measures and combat damage repairs. During war years the problem of repairing the Army transport fleet also changes. Instead of an orderly repair program based on competitive bidding, the problem is to obtain repairs and conversion in the least possible time. Competitive bidding and its attendant delays must be eliminated. The engineering, shipyard skills and techniques developed by peacetime support of an active merchant marine are among the most important factors which help to reduce ship repair time during periods of hostilities. There must be an orderly flow of work to the various repair yards based on the priority of the work to be accomplished, such priority to be determined, not on the basis of one service's needs, but on an analysis of the overall problem.

The Army has always relied principally on Merchant Marine type ships for its transports. There are probably many reasons for the lack of new construction designed to meet the Army's requirements, but the two primary factors are: Enforced economy during peace, and lack of time and materials in war. Today the transports in the permanent fleet are World War II vessels designed and built by Maritime Commission.

During the peace years our cargo vessel requirements do not differ greatly from those for commercial use. In times of war, however, many new features are introduced into cargo vessels. As a notable example, reference is made to the "meccano" decks on tankers during the last war for the transportation of assembled aircraft, the development of the ZEC (special Liberty type vessel) for the handling of assembled pursuit aircraft, the conversion of AK type cargo vessels to Port repair ships the conversion of five old Lakers as marine repair ships and many others. These conversions generally are planned to meet the needs of specific operations and it is not deemed advisable to attempt to design such conversions during the original design of new cargo vessels. In general, such conversions can be made to fit vessels already in existence during periods of hostilities. However, the vessels must be immediately available as generally time does not permit the building of new vessels. It is from our Merchant Marine that such special purpose vessels must be obtained.

Naval architects and marine engineers can also make a great contribution by continued ingenuity on their part in the design of vessels, machinery, methods of cargo handling and in numerous other fields of endeavor. Such efforts will be a major factor in reducing vessel operating costs to the point that the American ship owner and the American Merchant Marine may compete on favorable terms with the seagoing commerce of other nations. We in the Army realize and appreciate how such an active Merchant Marine can be utilized in times of emergency and it is hoped that such a realization of the importance of a Merchant Marine will in time be accepted by the entire country.

Eugene Hoffman

Gene Hoffman Promoted

Eugene Hoffman, longtime Manager of Public Relations for American President Lines, has been appointed Passenger Sales Manager, a newly created position. This indicates the importance the Company places on having an official of Hoffman's abilities and experience in one of the prime revenue-producing departments.

During his fifteen years of handling public relations for the Line, "Gene" Hoffman has become exceptionally well known in press and radio circles and the shipping industry. He has long been Secretary-Treasurer of the San Francisco Propeller Club and has been the spark plug for many a maritime activity.

General Heileman

Major General Frank A. Heileman recently succeeded Major General Edmond H. Leavey as Chief of Transportation for the Army.

A native of Missouri, General Heileman entered the Army during the first World War, being commissioned a lieutenant of infantry in 1917. During World War II he served in logistics and transportation assignments in Washington and Manila. On his return to the United

General Frank A. Heileman

Army Chief of Transportation

States last fall, he became Assistant Chief of Transportation and later Deputy Chief of Transportation. He has the Distinguished Service Medal and the Bronze Star.

General Leavey, who visited San Francisco a number of times in recent years on inspection trips of San Francisco Port of Embarkation facilities, has been assigned as The Army Comptroller.

C. E. Reed

Hyde Moves N. Y. Office to Bath; Reed Retires

Rodney E. Ross, President, Hyde Windlass Company, Bath, Maine, announces the retirement of Clarence E. Reed as of June 30, 1948. Reed has been in charge of this Company's office, formerly located at 91 Chambers Street, New York City, for many years. The New York Office of the Hyde Windlass Company has been discontinued. All customers in this area are requested to forward their inquiries, orders and other correspondence to the home office at Bath, Maine.

The Hyde Company suggests that all operators in need of telemotor repairs or adjustments contact the Telemotor Repair Service Company, 120 Liberty Street, New York City. The Telemotor Repair Service Company is also qualified to inspect, service and make normal adjustments to Hyde hydro-electric steering gears. It is requested that all other matters except telemotor repairs and normal adjustments to hydro-electric steering gears be referred direct to the Hyde Windlass Company, 574 Washington Street, Bath, Maine.

Taggart of Mackay Radio

Walter Taggart

Marine Superintendent for Pacific Division of Makay Radio and Telegraph Company, Walter Taggart is a native San Franciscan. He began his career directly after high school, going to sea as a radio operator on the *Cuzco* for the Grace Line, the *Lake Miraflores* for the Santa Cruz Oil Company, and the *Edwin B. DeGolia* for the Hillcone Steamship Company. He sailed on several ships of the Standard Oil Company of California, *D. G. Scofield, H. T. Harper, J. C. Fitzsimmons, El Segundo, W. S. Rheem* and *Bahrein.*

Taggatt joined Mackay Radio and Telegraph Company as a radio operator at San Francisco Marine Coastal Station KFS in early 1936. He was transferred to the San Francisco Marine Division Shop as a Radio Inspector the same year, and several months later was appointed Assistant to the Marine Superintendent in the San Francisco office. In 1944 he took on his present position with the company.

Makay Radio handles the radio and radar requirements for several hundred Pacific Coast vessels, and in the Pacific area maintains both marine service depots and coastal stations at Seattle, Portland, San Francisco, Los Angeles and Honolulu. Marine Service facilities are also available in Manila. World-wide coverage is provided by the company's facilities on the East and Gulf Coasts and through agents at all principal foreign ports.

Mackay Radio manufactures its own radio telephone, radio telegraph, radio direction finder and auto alarm equipment, and are authorized agents for Raytheon Manufacturing Company in the sale and maintenance of Mariners Pathfinder radar equipment.

Crary Elected Bethlehem Treasurer

Sherman L. Crary has been appointed Treasurer of Bethlehem Pacific Coast Steel Corporation, succeeding E. B. Hill who is retiring. Crary has been Assistant Treasurer and Secretary of the company and will continue as Secretary.

Following graduation from Stanford University in 1929, Crary was with the Palo Alto National Bank as Assistant Cashier. In 1935 he began work in the Accounting Department of Bethlehem Pacific and two years later was transferred to the Treasury Department. He was appointed Assistant Treasurer and Secretary in 1945. Crary's headquarters will be at the general offices in San Francisco.

Ben Ohm

Ben Ohm Forms Ship Service Company

Ben Ohm, formerly Superintendent for Mitchell Stevedoring Company, San Francisco, and well known in Pacific Coast maritime circles since he joined the old Pacific Steamship Co. in 1913, last month announced the formation of the Ohm Ship Service Company.

Headquarters and offices of the new firm are at 289 Steuart Street. With Ben Ohm as owner, the new firm is engaging in ship maintenance, boiler cleaning, tank cleaning and ship scaling and painting.

Bull Elected Moran Secretary

John S. Bull, who has been handling most of the Moran Towing & Transportation Co.'s postwar business with European ship owners, has been elected secretary of the firm.

Bull joined the company's sales department in 1940. From 1942 to 1946 he served in the United States Navy as a convoy Officer attached to the Third Naval district port director's office and as a repair officer at Pearl Harbor.

He is a graduate of Columbia University.

John S. Bull

BIG SHIP CONSTRUCTION PROGRAM UP TO PRESIDENT TRUMAN

Chairman Smith of the Maritime Commission and Secretary Forrestal have submitted recommendations for immediate launching of a $178,000,000 vessel construction program with an additional $222,000,000 to be available over the next three years. The last Congress appropriated $94,000,000 for a start during this fiscal year and there is an additional $84,000,000 carry-over providing it is used by September 30.

Included in the recommendation are eighteen modern passenger ships and combination passenger-cargo ships for eight operating companies. Also included are twenty high-speed tankers and two coastwise passenger and automobile carriers for the San Francisco-Los Angeles run. It is expected that any benefits provided by the next Congress under a revival of the Weichel Bills will be applicable to this program.

The reaction of the President is uncertain but the recommendations were made at his request.

* * * * *

H. F. ALEXANDER'S PROPOSED SHIPS

Following the announcement of the recommendations referred to in the item above, H. F. Alexander stated that his plans are well along and that bids will be called for very soon. It is reported that the plan is for the Maritime Commission to carry 80-odd per cent of the cost of the two ships which the operators will pay out during a number of years. Deducted from the total would be such construction subsidy as the next Congress may enact.

* * * * *

DOLLAR DECISION DEFERRED

The Federal Court decision over the ownership of the American President Lines has been deferred from June 30 to some time in the fall. Judge Matthew McGuire requires further time to study the case.

* * * * *

APL'S V-2000 SHIPS

There are no developments on these vessels since APL'S president Killion proposed that the Maritime Commission build the ships and APL would charter them. These ships are included in the group mentioned in the first item above.

ALASKA FREIGHT RATES ARE REASONABLE

The Maritime Commission on June 21 decided that claims by various interests that ship freight rates were retarding Alaskan growth are unwarranted.

* * * * *

THE 50-50 DEAL

A preliminary outline of the methods by which American Steamship companies will be assigned 50 per cent of Marshall Plan cargo will be announced before July 15. As progress is made in this direction, details will appear in this publication.

* * * * *

PLANT RUBBER ABSORBED BY PARAFFINE

On July 1 the Plant Rubber and Asbestos Corporation, a wholly owned subsidiary of the Paraffine Companies, began the "Insulation Division" of Paraffine. The "Plant" trademark will be retained.

* * * * *

COLUMBIA STEEL'S PURCHASE OF CONSOLIDATED IS O.K.

The United States Supreme Court has refused to block the purchase of Consolidated Steel Corporation by Columbia Steel. The Department of Justice had claimed that the proposed purchase would violate the Sherman Act.

* * * * *

CONSOLIDATED STEEL NAME CHANGED

On July 1 the name of Consolidated Steel Corporation, Los Angeles, was changed to Consolidated Western Steel Corporation, and the South San Francisco, Vernon, Fresno, Bakersfield, Taft and Phoenix plants of Western Pipe and Steel Company, and the Berkeley plant of the Steel Tank and Pipe Company became operating units of Consolidated under the new corporate name. See item next above.

* * * * *

NEW MARITIME COMMISSIONER

On June 20 President Truman announced the nomination of David J. Coddaire of Lowell, Massachusetts, for a six year term on the Maritime Commission. Coddaire is a former attorney-general of Massachusetts and was appointed to fill the vacancy created by the resignation of Richard Parkhurst, Boston Republican.

* * * * *

MARITIME ACADEMY GETS APPROPRIATION

The sharply reduced congressional appropriation for Merchant Marine training will not seriously affect the academy at Alameda, California. It will be possible for the school to continue with a teaching personnel of about 80.

WATERMAN REFUSED COAST ROUTE

The plan of the Waterman Steamship Corporation to establish an intercoastal service between Pacific and Gulf ports has been upset by the Interstate Commerce Commission which ruled that there is no need for an additional service on this route.

* * * * *

SHIPPING EXPERTS URGE CONSTRUCTION PROGRAM

A group of American delegates to the recent safety conference in London, which includes many top-ranking members of the industry such as Admiral Farley, Admiral Shepherd, Gerrish Smith, Admiral Glover, Admiral Brand, J. L. Luckenbach, James Bates, and Stephen Bechtel, reports that the British are building one hundred passenger and combination passenger cargo ships in their own yards, while France is building five and the United States is building none, and they urge that U. S. shipping get started.

* * * * *

GURALNICK AND BIESEMEIER

This is the firm name adopted by Morris Guralnick and Harold Biesemeier (Rear Adm. U.S.N. Ret.) who have recently become associated as marine surveyors, engineers and architects in San Francisco.

* * * * *

NEW ALASKA SERVICE

A new and entirely private service between the West Coast and Alaska is now being planned by the Coastwise Line, according to reports. The service, if approved by the Government, would be performed by three chartered Liberty ships, without Government subsidy aid, and would link Los Angeles, San Francisco and Portland, Ore., with Seward, Alaska.

* * * * *

BOTTOM PLASTIC JOB ON PRESIDENT CLEVELAND

The PRESIDENT CLEVELAND has been put in drydock at Bethlehem, San Francisco, for a complete job of cold plastic coating, using Pabco material.

* * * * *

LATE RULING ON FLAG DISTRIBUTION OF MARSHALL PLAN CARGO

Colonel Arthur G. Syran called a meeting of Foreign Shipping Missions in Washington on July 8 and announced that three classifications of cargo types will be recognized--liner, bulk and tanker. Every six months a survey will be made to determine that U.S. owned vessels are getting their allotted share; and that progressive reports will be expected so that a monthly trend can be noted.

The controversial "market rate" provision in the law will be administered broadly on a trade route basis. The market rate will be realistically considered in the light of all circumstances including the need for assuring continuous route service and a reasonably profitable operation. Colonel Syran asked for continuing suggestions from all concerned for a sound administration of the law.

The Women's Organization Installation

Top picture shows group at head table during the June meeting of the Women's Organization for the Merchant Marine, San Francisco. Standing is Madam Sumaria of Java who spoke at length on conditions in her country.

Left to right facing camera are: Mrs. Harry Parsons, ex-president; James S. Hines, publisher, PACIFIC MARINE REVIEW, who acted as installing officer; Madam Sumaria; Mrs. John F. Johnston, retiring president; Mrs. Julie Lynch of the Netherlands Information Bureau; Mrs. Alfred Pittman, new president; and Mrs. Worth Johnson, director.

Lower picture: Mr. Hines presiding at the installation of new directors of the Women's Organization.

The Designer Had a Reason for It

(Continued from page 47)

perience and knowledge of many well established bearing manufacturers are generally used. In order for these several suppliers to maintain leadership in their fields, they have found it advantageous to carry on considerable research and development, all of which information is available to the engine builder as a specific aid in the development of the engine. Concurrently with bearing design comes the problem of lubrication and proper selection of bearing clearances in order that the lube oil may satisfactorily perform its dual function of both lubricating and cooling.

The selection of type of bearings is exclusively today that of the precision type. By precision type we mean the relatively thin separate shells for both upper and lower halves made of either steel or bronze and lined with a thin coating of bearing lining material. The selection of material for lining is based on the loads imposed and the hardness of the journal itself. The bearings are classed as precision because they are made to dimensional tolerances less than one thousandths, and require no fitting whatsoever. Further, the engine can be run at full speed and full load immediately after installation without the usual break-in period.

The Connecting Rod

The next part under consideration is the connecting rod. Its main function is to transmit the forces of combustion from the piston to the crankshaft. This part being such an important link in the power transmission system, it likewise is subject to careful inspection, as to design and manufacture, by such groups as American Bureau of Shipping, Lloyds, etc. Like the crankshaft, it has an auxiliary role of acting as an oil duct to provide lubrication to the upper rod bearing and piston cooling if necessary. The rod length is based on a compromise between over-all height of the engine and the elimination of certain kinds of vibration. An infinitely long connecting rod would give smooth sinusoidal motion to the piston. The existence of the connecting rod gives a distorted sine wave motion to the piston wherein the acceleration value of the piston at the top of the stroke is different than that at the bottom. This difference of accelerating value causes unbalanced forces that become quite perceptible in engines of certain cylinder combinations. The shorter the rod, the greater the unbalance, and also the greater the horizontal thrust component causing piston to bear on the cylinder liner. Experience has shown that con rod lengths of from four to five times the crank radius represents an acceptable compromise. Once this decision has been reached, the connecting rod problem becomes one strictly of manufacturing. The design decisions are controlled by quantity to produce, facilities and cost. Basically, connecting rods do not present problems in operation.

The Piston

The function of the piston of an engine is to hold the combustion pressures. By moving and yielding to these combustion forces, the piston converts the gas energy to mechanical work. The piston must be structurally capable of withstanding the forces of combustion and the thermal loading as well.

To a limited degree, the piston accepts theoretical investigation by stress analysis of a flat plate supported in the manner of the conventional wrist pin. Combined with the pure stress analysis, the theory of similitude is

(Please turn to page 88)

The Delta Queen

AFTER 20 years of service on the Sacramento River out of San Francisco, the *Delta Queen*, 285-foot luxury tourist vessel that Capt. Tom Greene of Cincinnati will operate as a passenger liner on the inland waterways, arrived in the Queen City March 1, after a two-day trip from Pittsburgh.

For the last six months, the *Queen* has been undergoing a "beauty treatment" at Dravo Corporation's big Marine Ways in Pittsburgh, to remove her wartime coat of Navy gray and outfit her for long river cruises between Cincinnati and New Orleans and on the upper Mississippi to St. Paul.

Most of the work had been completed as the freshly painted four-deck vessel left Dravo's Neville Island Shipyard Feb. 28, bound for Cincinnati. There, she will be given a few finishing touches. Capt. Frederick Way, Jr., veteran river pilot, was at the controls when the *Queen's* stern paddlewheel moved her forward.

Besides modernizing the cabins to accommodate over 220 passengers, Dravo engineers, carpenters, welders, and painters have made many other changes in the vessel, most of them designed to lengthen her non-stop trip time. While operating on the Sacramento River in California from 1926 until the war, the *Queen* made only short trips hauling passengers and some 2000 tons of freight.

For planned 20-day inland river cruises, her fuel capacity had to be doubled. Additional fresh water tanks were installed, as well as equipment for filtering water used for washing. Refrigerating machinery for food storage was added. The main deck, built of Siamese ironwood, was converted from cargo storage into a modern dining room and recreation hall with soundproof ceiling and concealed lighting.

Eighteen feet were sliced off the *Queen's* stack so she can clear bridges during high water. Two observation decks supported by steel beams were built over the bow. Capt. Way explains that passengers like to get as near to the front of a boat as possible.

Specially designed fenders were welded to the *Queen's* steel hull to prevent damage while going through locks in the Ohio and Upper Mississippi Rivers. Steel grilles were installed under the teakwood railings around the decks as a safety measure.

The Delta Queen

The *Queen's* regal ornateness has been retained, however. Her grand staircase leading to the salon, built of oak, mahogany and teakwood with wrought iron trimming, still is intact.

The forced ventilation and heating system has been revitalized to insure maximum comfort for passengers as the *Queen* cruises along the Mississippi through the deep South. The dining room has been completely air conditioned.

Most of the staterooms have private showers and lavatories. They are two-thirds larger than the cabins found on oldtime river packets. Capt. Way said size of staterooms is unimportant because the passengers spend most of their time on deck or in the recreation hall where a social hostess plans daily entertainment.

The *Delta Queen* was built in 1924 in Scotland and shipped, piece by piece, to Stockton, California, for assembly. She cost $875,000, the highest price ever paid for a river steamer. Today, however, her owners, Greene Lines Steamers, Inc., place her value at close to $3,000,000.

During the war, the *Queen* was used by the Navy to shuttle personnel across San Francisco Bay. After Capt. Greene bought her, she was piloted by Capt. Way 5,000 miles through the Pacific, Panama Canal, Caribbean, Gulf of Mexico and up the Mississippi and Ohio to the Dravo Shipyard at Pittsburgh.

Harbor Day Plans

Plans for a mammoth three day celebration of Harbor Day—August 6, 7 and 8—receive their final approval from the key committeemen of the Junior Chamber of Commerce, sponsors of the annual event, under the chairmanship of Joseph E. Delsol.

Standing (left to right) are Robert Parsons, Arthur Balaz, Dr. William Nelson. Seated (left to right) William Minnes, Joseph E. Delsol, Moore Pilgrim and Rudy Enberg.

Scheduled by the Committee are yacht races, outboard motorboat races and regatta, a water follies and swimming races. Also included in the celebration will be a tour of harbor facilities for Northern California shippers and a luncheon at the S. F. Commercial Club at which an executive of the Port Authority of New York will deliver the principal address.

Meters and Control

(Continued from page 68)

type fuel flow-air flow ratio control readjusts combustion air flow.

Systems 2 and 4 have the advantage that the fuel supply is always limited to the available supply of combustion air. However, if a reasonably low value of excess air is to be maintained during the port condition, air regulating dampers must be well designed and leakage through the dampers and at other points must be held at minimum values. Obviously, if there is no regulation of air flow at port loads, there can be no regulation of fuel with the second arrangement and thus no steam pressure control at these low rates.

With systems 1 and 3 it is possible to provide a stop or by-pass on the damper which will permit a safe minimum air flow, and below this point the master pressure controller regulates only the fuel supply.

For installations requiring extremely rapid maneuvering over a wide load range the parallel-series system gives best results as fuel and air are changed simultaneously in accordance with the load change.

The arrangement of the combustion control for approximately 800 ships for the U. S. Maritime Commission and private owners is shown in Fig. 1. This is a very simple system involving only the minimum amount of equipment necessary to operate the boilers at the required rating and to maintain the proper fuel-air relationship. This system has been designed with the underlying thought that most of these ships will be operated by relatively new and inexperienced personnel and therefore a standardized arrangement has been used and the equipment made just as simple as possible.

Fig. 2 shows the arrangement of meters and control for a turbo-electric tanker. Recording meters are provided which give a continuous record of steam pressure, combustion efficiency and flue gas temperature, so that a complete picture of the performance of the boilers and of the automatic control is available to the operators as well as the supervising engineers at all times.

Boiler Feedwater Control. Regulation of feedwater to the boilers is not a particularly difficult job, but one which is so important to continued operation of the plant that only the most reliable men can be assigned to the job. Likewise only the most reliable type of automatic regulators can be used for this job. In the modern steam plant using watertube boilers and using one or more feedwater heaters or economizers it is important that the feedwater flow be steady and approximately equal to the steam output. Severe cycling of the feedwater flow may result in cycling of a number of other auxiliaries, and cause appreciable reduction in overall plant efficiency.

Cyclic action of the feedwater control is usually caused by surges in the water level in the drum ordinarily due to variations in the volume of steam below the waterline. The amount of surge is influenced by the operating pressure, concentration of the feedwater, the arrangement and effectiveness of the circulating system in the boiler, and the amount and arrangement of the steam liberating surface in the boiler drum. Marine water-tube boilers are being built with drums in which the steam relieving rates vary from 500 pounds per hour per square foot to approximately 5000 pounds per hour per square foot of area at the water level.

For these various types of boilers different kinds of feedwater regulators are available, including the self-actuating single element regulator, the pilot-operated single element regulator, Figs. 4 and 5; and the pilot-operated multiple element regulator, Fig. 6.

For boilers operating at pressures of 400 pounds and above, and having steam liberating area so that the steam release is not in excess of 1200 pounds per hour per square foot, the self-actuating single element regulator, similar to Fig. 4, is entirely satisfactory. This regulator requires no outside source of power for operation, as the generator assembly connected to the boiler drum develops sufficient pressure for actuating the feed valve.

This self-actuating regulator operating only from drum level can often be used with entirely satisfactory results on boilers operating at higher pressures, and boilers equipped with level stabilizing devices within the boiler drum when the steam relieving rate materially exceeds 1200 pounds per hour per square foot. However, applications of this nature should be made with greater care and should be made only when full knowledge is available concerning the operating conditions to be encountered.

For those installations where remote manual operation of the feed valve is desired, or where the type of feed regulating equipment does not readily adapt itself to the use of the simpler self-actuating regulator, the pilot-operated regulator similar to Fig. 5 may be used. This regulator consists of a level responsive device which may be of the recording or indicating type and which may, if desired, be located on the boiler control panel, with the level responsive device actuating a pilot valve usually of the pneumatic type, so that sufficient pressure is developed for actuating the main feed regulating valve or other supply means.

An important advantage of this type of control is that relays may be added to permit the control to be adjusted for a broad operating range, and still maintain a constant level standard over the entire range of rating of the boiler. This permits smooth regulation of feedwater flow with close maintenance of level. Its only disadvantage is that it requires an outside source of power, which ordinarily is no serious handicap, as compressed air is usually available at all times.

For boilers in which considerable surge of the drum level is encountered, due either to extremely high steam relieving rates or to extreme operating conditions, a multiple element type of feedwater regulator is used. In this regulator the rate of water feed is proportioned primarily to the rate of steam output and the level measuring element is used only as a secondary readjustment having a limited range. A regulator of this type is shown in Fig. 6.

By actually metering the steam flow and the feedwater flow these two values can be very closely proportioned so that only a very limited amount of correction from drum level is necessary, and at the same time the drum level will be maintained within close limits. This type of regulator also has the advantage that it may be adjusted to carry a higher level with high ratings, so that the boiler is better protected against sharp reductions in load and the resultant shrinkage in the drum level. Likewise there is less chance of carry-over upon sharp increases in load, as the level is lower at the low rates, and therefore the drum has capacity to absorb the swell.

This regulator is also pilot-operated and uses compressed air for its operation. Many of the parts are identical with those in the combustion control system, so that a minimum number of spares are required where

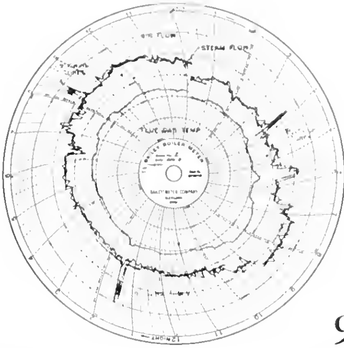
the same make of equipment for the control of feedwater and combustion are installed.

Steam Temperature Control: In the past few years increasing use has been made of the boiler designs which permit regulation of the superheated steam temperature. This regulation is accomplished either (a) by desuperheating all or a portion of the steam between primary and secondary sections of the superheater, or (b) by means of dampers which divert all or part of the flue gas passing over the superheater, or (c) by means of a divided furnace construction with individual control of the burners on the side of the furnace where the gases pass through the superheater section of the boiler. In view of the importance of close control of steam temperature, particularly as steam temperatures increase, automatic control of temperature should be used to insure against exceeding safe limits, and to obtain most economical operation of the turbines or other propulsion machinery.

Control of steam temperature by desuperheating a portion of the steam between primary and secondary sections of the superheater is illustrated in Fig. 2. Note that a 3-way valve is actuated by a diaphragm motor which receives its air pressure loading from the steam temperature indicator-controller. This valve either forces all of the steam through the desuperheater located within the boiler drum or bypasses a portion or all of the steam around it to maintain a constant temperature at the superheater outlet.

Miscellaneous Controls. There are many places in a ship's power plant where automatic controls can be used to advantage for maintaining oil, water or steam temperatures or pressures, and tank or heater levels. Use of controls will in many cases result in smoother and safer operation, and conserve the operators' time for more important duties.

By selecting controls for these various auxiliary services which are similar in design to the boiler controls (see pressure reducing and desuperheating station, Fig. 7), it is possible to train one or two men in the maintenance of this equipment and considerably less time will be required for maintaining and checking the performance of the control equipment than would be required for manual operation of the functions which it performs.



9

Boiler meter chart containing records of Steam Flow-Air Flow relation and Flue Gas Temperature. Records like this graphically illustrate boiler operation.

The value of recording meters for flow, level, pressure and temperature has not been fully appreciated by all marine engineers. Some of the hesitancy to use meters which provide the continuous record is due to the fact that the manufacturers of this equipment have been slow to make it suitable for the pitch and roll and the atmospheric conditions which are likely to be encountered aboard ship. Considerable progress has been made by the manufacturers however, (as illustrated by the area meter used for liquid measurement, Fig. 8), and as soon as the marine designers and operating engineers begin to see the advantage of keeping a continuous log of important operating conditions automatically, this equipment will be used more extensively.

Not only is less time required for maintenance of the necessary metering equipment over that for manually recording the data, but the records are kept in better shape and all of the important conditions are recorded. Since the recorder is on watch every minute of the day, no unusual conditions escape its notice; if any faulty operation develops, a complete story of conditions prior to, during and after the fault is available for reference. See steam flow-air flow and exit gas temperature chart, Fig. 9.

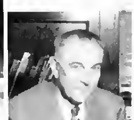
Simmons Company Announces New Appointment

Chelton G. Kennedy, Sales Manager for the Pacific Division of the Simmons Company at San Francisco recently announced the appointment of E. Frank Poston as Contract Manager for the Pacific Division. Associated with Poston in the contract department is James G. Porteus who has been in the engineering department at the San Francisco plant since 1939.

Before coming to San Francisco, Poston was with the Simmons organization in Chicago as Contract Manager for the Central Division.

Chelton G. Kennedy

James G. Porteous



E. Frank Poston

Steamer Freight Rates

(Continued from page 50)

prices. Moreover, the record shows that transportation costs account for only one-half of the difference between unit costs of food in Honolulu and in San Francisco. These statistics may or may not be representative, but in any event, it would not be just to deny reasonable rate increases to a common carrier for the simple reason that merchants use such increases as an excuse to inflate their prices.

The intimations of inefficient management made by the Consumers Council are based on the slow turnaround of vessels and Matson's acquisition and reconversion of vessels during a period of peak prices. The record shows that vessel operation was slowed down on account of port congestion which in turn was due to a backlog of shipments resulting from strike and other conditions. The new and faster fleet should provide much quicker turnarounds than were possible during 1947. At any rate, there is no evidence of inefficient operation—it is all to the contrary. The wisdom of the management in acquiring its fleet when it did, and adapting it to the trade through reconversion, is a question which must be resolved in the light of future operating results.

As proof that increased rates are not warranted, the Consumers Council compares Matson's earned surplus and sundry operating reserves, totalling $24 millions, with its capital stock of around $33 millions and on which substantial dividends have been paid for many years past. In evaluating this comparison, the fact should not be overlooked that these balance sheet figures show cumulative results and cover Matson's whole operations. Each operation should stand on its own bottom, and this inquiry is to determine whether Matson's common carrier freight operations in the Hawaii service are being conducted at reasonable rates.

While the evidence here reveals operating losses, it provides no reliable basis upon which to predicate a reasonable and stable rate structure for the future. This is true because 1947 operations were conducted partly with old ships and under unusual traffic and shipping conditions. A more appropriate test period would include operation under the new, faster and presumably more economical fleet.

This record supports certain conclusions which merit consideration in the fixing of, or judging, the rate structure in the Hawaiian trade, which is under review here for the first time.

First, the transition from the old to the new operation is a stage of new development necessitating extra costs, capital and otherwise, chargeable to development. Development costs do not necessarily increase, immediately and *pro-tanto*, the value of the service to the shipper. They are a business risk, assumed for the future, and should be spread out over the future.

Second, Matson has enjoyed a long and successful operation in the trade, thereby accumulating large reserves which have been converted into a modern fleet. The purpose of this, undoubtedly, was to place the company in a position of greater earning power. Other things being equal, Matson should progressively achieve such position. It is questionable, therefore, whether during this period of transition and development, the highest permissible return on investment is warranted.

Third, this is a revenue case and no consideration is given to individual rates. Hence, the rate structure for the future should distribute the burden equitably with due consideration given to the ability to pay.

The Commission should find that the rates, charges, regulations and practices in issue have not been shown to be unlawful.

The proceeding should be discontinued.

Basil Harris Dies

Basil Harris, Chairman of the Board of the United States Lines Company, died June 18 in New York City.

Born in Pullr an Illinois, October 31, 1889, Harris was an outstanding figure in American shipping for many years. He began his shipping career shortly after his graduation from Princeton University in 1912. He first joined the firm of Norton, Lilly & Company in New York and later became a partner with General John M. Franklin, now president of the United States Lines, and the late Kermit Roosevelt, son of President Theodore Roosevelt, in the Roosevelt Steamship Company. Subsequently the Roosevelt Company was merged with the United States Lines' organization.

Basil Harris

Harris, who has been vice president since 1931, and later executive vice president, became president of the United States Lines Company in 1942 succeeding John M. Franklin who entered the U. S. Army Transport Service and held the rank of Major General when he was released from active duty. When General Franklin returned to civilian life in November 1945, he was reelected to the presidency and Harris was elected chairman of the board of directors.

In the forefront of port development, Harris was an important figure in the greatly needed program for cargo protection. He was a director of the National Federation of American Shipping, a member of the U. S. Chamber of Commerce Committee on Harbors and Shipping, a trustee of the United Seamen's Service, a director of the American Merchant Marine Institute Arbitration Association, and a member of the board of managers of the American Bureau of Shipping.

The Designer Had a Reason for It

(Continued from page 82)

most effectively applied. This is nothing more or less than using the basic design characteristics of a similar successful part on a larger or smaller engine. You will tread safer ground, however, if the similar design has been successfully used on a larger engine. By combining the factors above with experience and good judgment, the final answer is still only going to be determined by conclusive tests. All of the factors enumerated can still be delegated to an insignificant role unless the best of metallurgical technique and control are used in the production of the piston.

The Piston Rings

The piston rings are called upon first to seal the pressures of combustion; second—to transfer heat from the piston to the cylinder walls; and third—to control lubrication. There are hundreds of oil ring designs and hundreds of claims of superior performance. Like many other factors, the selection of piston rings is determined by exercising experience and good judgment, followed by conclusive tests.

The Combustion Chamber

The combustion chamber is one of the most highly patented features of the present day diesel engines. There are many good forms and shapes, and the governing considerations are the desired location for accessibility of the nozzle, and the speed and anticipated application of the engine.

The Cylinder Head

The cylinder head is the roof of the combustion chamber. On larger engines it usually contains the nozzle and valves. The design and complexity are greatly affected by engine design, such as whether two or four cycle, and if two cycle, whether loop scavenge or uniflow; and if four cycle, whether valve in head design is to be used. The cylinder head must be capable of structurally withstanding the forces of combustion and should be capable of handling all thermal loadings. Uniform cooling passages are essential. The major limitations are

(Please turn to page 98)

Moore Dry Dock Building Standard Oil Barge

(Continued from page 54)

lon capacity.

One Gasoline fuel tank—250 gallon capacity.

One Pumproom Sump tank—20 gallon capacity.

Three Lubricating oil storage tanks—50 gallon capacity each.

Simmons metal beds are provided in the staterooms and a standard radio receiving set is in the galley. Bathroom fittings and hardware are Crane. The electric refrigerator is General Electric and the range, Nesco. Windlass mooring winch and hose hoist are Markey.

"Where am I?"

(Continued from page 61)

ed making meridian altitude observations in the company of other navigators when their altitudes differed by one or two minutes from those of the other observers. Why? It has been found that some observers have a natural tendency to bring the body too deep, that is down below the horizon, thus getting a greater altitude than really exists, while others have just the opposite tendency with opposite results.

I bring these things to mind, not to try to convince navigators they should have a thorough physical and psychological examination prior to making observations, but rather to ease the mind or clear away doubts as to their ability to make good observations.

A more probable reason for the lines of position not plotting properly is the variation of the amount of *Refraction.* Refraction, as we all know, is the bending of the light rays as they pass through the earth's atmosphere. We usually accept that as a definition, look up the correction as it is tabulated in the Nautical Almanac or elsewhere, apply that correction and let it go at that. The value of this correction is a mean value and is given for a temperature of 50 degrees Fahrenheidt and a barometric pressure of 30 inches. Tables 24 and 25 in Bowditch give us additional corrections to apply to the mean refraction for temperature and barometric pressure which we seldom apply. Before going further let us think for a moment on what causes this variation of refraction. Two factors govern this. First, the distance the light rays have to travel through the atmosphere. Second, the difference in the density of the atmosphere.

We know that the atmosphere extends from approximately 50 to 70 miles above the surface of the earth so we can easily see that when the altitude of a body is low the light rays have to travel a much greater distance than when the altitude is greater. Traveling this greater distance causes the light rays to suffer a greater bending; hence the refraction is greatest when the body is in the horizon. Now if these light rays have to travel a greater distance they surely will be subjected to a greater number of variations of density of atmosphere thus causing an undetermined amount of error. As the altitude increases this amount decreases but is still undetermined and as a result we do not have an accurate line of position even though we do apply the corrections given in Tables 24 and 25.

So far we have discussed only refraction of the light rays from the body to the observer's eye. We have another refraction of the light rays between the observer's eye and the horizon which is quite often large enough to throw our sights out quite a lot. This error is found most usually when the air and sea temperature differ greatly or when the air is calm, thus allowing different density stratas of air to build up near the surface. There is no practical way for surface navigators to estimate this error or correct for it. It is known though that this error is greatest when observations are made from a low height of eye. This being true the prudent navigator would do well to remember that when the air is calm and the sea temperature differs greatly from the air temperature he should make his observations from as great a height of eye as possible. Then, too, don't be too disappointed if the sights don't plot well.

KEEP POSTED

New Equipment and Literature for Yard, Ship and Dock

New John Crane Pipe Joint Compound

Recently put out by the Crane Packing Company, Chicago, is an improved pipe joint compound known as Plastic Lead Seal No. 2 (Underwriters' Laboratories Approved) which can now be had in 1, 2, 4 and 8-ounce tubes.

Brushed on threads, gaskets, flanges, studs, bolts, nuts and plugs, it stops galling or rust of threads and never hardens or drys out. It assures tight, permanent joints that are easily taken apart later. The compound does not injure or stain polished finishes, is insoluble, will not wash out and seals air, water, steam, refrigerants, butane, propane, other petroleum derivatives, CO^2, etc., at temperatures to 500° F. On well finished surfaces, it has been used as a seal in place of a gasket.

The 8-ounce tube is designed for such uses as plumbers' repair kits and general industrial applications; the 4 and 2-ounce tubes for general home and shop use; the one-ounce size is for use by manufacturers of such equipment as hot water heaters, pumps, air conditioning and refrigeration units, to enclose in assembly kits.

Grip-Dek

Another useful marine product, developed for use during the war is Pabco Grip-Dek, a mastic flooring for covering steel, galvanized iron and concrete ship decks.

Developed to meet Navy Department specifications, Grip-Dek was specified then—as it is today—for use on Navy supply and fighting ships where a light-weight, non-slip, fire-resistant, non-corrosive surface was required to insure a firm footing on water-washed decks, gun platforms and passageways as well as in below-deck traffic areas. It was to be light-weight, fast-drying, readily applied and to possess a low gloss surface.

Application of Grip-Dek.

The Navy Department adopted Pabco Grip-Dek after conducting a series of rigorous tests aboard various classes of craft operating under different sailing and climatic conditions.

Following the war, Grip-Dek was made available for general marine use and was quickly adopted by the commercial shipping industry to meet the same general need as the Navy Department's.

Officials of the always "safety-conscious" shipping industry report that they have materially cut their ocean-going accident rate after Grip-Dek installations, providing a firm footing not only on exposed weather decks but down in the engine room, where a slippery oil and grease condition is often prevalent. On passenger lines a steadier footing to the inexperienced seagoing traveler is provided.

Because of its adhesive qualities, Grip-Dek is highly resistant to vibration or wearing of the decks. It is readily spread with a trowel, dries quickly and thus does not interfere with the normal operation of the ship during its installation.

Pabco Grip-Dek Deck Covering comes packed in convenient five-gallon and one-gallon containers easily stored and ready for immediate use, in white, tile red, gray and brown.

New De Laval Single Stage Centrifugal Pump Catalog

For the first time, De Laval Steam Turbine Company single stage pumps have been included in a single comprehensive catalog (Bulletin No. 83-29) presenting outstanding features of De Laval design and construction, listing pump ratings and incorporating essential dimensions. With this catalog, engineers can select the required pump, estimate motor size and plan approximate installation dimensions.

In replacing several separate leaflets for these pumps, the one catalog now contains information for all G, I, K, L, M and P single stage, single and double suction pumps. The catalog also gives brief descriptions of such optional features as mechanical shaft seals, self-priming systems and vertical mountings.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

....issue. Page No..............

....

....

....

(Identify by name of manufacturer and catalog)

NAME ....

BUSINESS ....

ADDRESS ....

....

San Francisco Bay

(Continued from page 41)

patterns for Naval vessels.

SHEET METAL SHOP—construction of sheet metal furnishings and shipboard equipment.

ORDNANCE SHOP—repair of ship guns and fire control machinery.

ELECTRICAL SHOP—repair and rewinding of armatures for electrical motors and generators.

PIPE SHOP—shaping by heat and pressure varieties of copper and iron pipe.

RIGGING LOFT—splicing of wire rope and weaving of rope fenders for tug boats.

PATTERN SHOP—construction of patterns for all foundry castings and building of scale model ships.

MACHINE SHOP—balancing of giant ships propellers.

FORGE SHOP—operation of 2000 ton forge press.

NAVAL FLAG LOFT—only one on the West Coast.

FOUNDRY—preparing molds and pouring brass and aluminum castings.

TRAINING AND APPRENTICE SCHOOLS

INDUSTIAL LABORATORY.

ARTIFICIAL LIMB SHOP OF THE NAVY HOSPITAL—for groups of related professional interests only.

"MOTHBALL" FLEET UNITS.

Seaplane Floating Dock

United States Navy seaplanes now can carry complete docking facilities along with them to advanced bases. An inflatable, rubberized fabric dock with plywood decking that is light enough for air transport, has been developed jointly by the Navy Bureau of Aeronautics and the Goodyear Tire and Rubber Company. The development grew out of a wartime need for docks at advanced bases before the arrival of construction crews.

The new seaplane floating dock is constructed of nylon coated fabric pontoons covered with a marine grade plywood. Each pontoon is 25 feet long by seven feet wide and is constructed of four separate, cylindrical air chambers.

When completely assembled, nine of the pontoons are arranged together to form an elongated "U" shaped floating dock. The completed unit can be erected in from four to six hours by an inexperienced crew.

First ship to be docked in the U. S. Navy's air transportable seaplane mooring was the PBM MARINER shown in this official Navy photo (below). Components for the floating dock may be disassembled and flown to advance bases of operation for temporary seaplane mooring facilities.

Rope Manual

A beautifully illustrated Manual of Rope Usage was recently published by the Plymouth Cordage Company, Plymouth, Massachusetts. Invaluable to the rope user, the book contains a manual section and a catalog section, all replete with pictures and tables.

The manual contains a brief historical sketch of rope uses and ropemaking from prehistoric days to the 19th century. There is an illustrated description of the most important ropemaking fibers and the plants from which they come, including a reference chart. The actual ropemaking operation is described and the care of rope. Illustrated instruction in splicing methods is included in this section and also information on how to tie and use the seventeen most commonly needed knots.

There are several useful rope tables, including rope strengths, weights, rope sizes for sheaves, effect of sling angles, etc. The treatment of rope is also dealt with in this section and the rope requirements for particular jobs.

The catalog section includes a section on ship brand manila rope and rope information for marine, fishing and yachting purposes and industrial, hardware and farm. Oil field ropes are discussed, synthetic fiber ropes and wire rope centers, as well as various types of twines. A condensed glossary of words most frequently used in ropemaking and a rope use index completes the book.

Herb Southworth Offers Two New Booklets

Now available at the Herb L. Southworth Company, 110 Market Street, San Francisco, are two new technical booklets. The first, "The Kingsbury Guide Book," outlines the principles and construction of Kingsbury Bearings and indicates their chief present fields of use. The Kingsbury principle of wedge-shaped oil films and its scope in machinery design is presented in the booklet, and the main features of the bearings, encountered in all applications, are described. These include the distinction between "adjustable" and "equalizing" types, which covers both horizontal and vertical (shaft) applications and is fundamental to an understanding of them. The various bearing forms are grouped, first by the number of shoes, then by the intended use.

The other booklet is on the subject of Pedrick piston rings and covers recent trends in piston ring design and application.

Mechanical Flow Meter Bulletin

Ring Balance mechanical flow meters, Series 2200-2600, are described and illustrated in detail with photographs, diagrams, and data on dimensions and capacities in a new 12-page bulletin designated 2M48 by the manufacturer, Hagan Corporation, Pittsburgh. The bulletin, which succeeds one identified as 2M47, describes the ring balance principle of operation, which is said to be unique in that it maintains high accuracy at low flows. Among other reported features are ease of adjustment, recalibration by deadweight method or by a water column, high accuracy and elimination of over-range-operation troubles, for both low pressure (Series 2200) and high pressure (Series 2600) flow meters of this line. Models manufactured include recording and indicating flow meters, indicating-integrating flow meters, steam flow-air flow boiler meters, dual-type meters and units for special applications.

Flexible Stanchion Developed by Hyet and Struck

'he Hyet and Struck Engineering ıpany of San Francisco has been ıged in the business of repair-g hips for a number of years and ıof their jobs is the repair or re-a·ment of pipe hand rails. In the ınal course of loading or dis-ıging cargo on a ship, pipe hand i get damaged by hatch pon-cs, hatch beams, or cargo bump-g nto them, all of which is a con-a expense to ship operators and 'ents a certain hazardous condi-ı during the time that they are ıged or broken.

The Hyet and Struck Engineering Company has developed a flexible stanchion which will survive a much more severe blow than is usually received by any existing hand rails; it will give with this excessive pressure but will return to a normal position when the pressure is removed. As a result there is never a time when any area is unsafe because of a damaged railing. Tests have been conducted by the company subjecting the stanchions to severe strain, many times greater than would be received in normal use, without any damage occurring except on one occasion when a ram weighing 1½ tons was swung a distance of approximately 20 feet. This strain is at least ten times more severe than in any normal use.

It is thought that the use of these stanchions, with chain rail, will provide a ship with greater safety, insofar as hand railing is concerned, at a great saving in money to ship owners.

ıg-load of lumber moving inboard ı an intercoastal freighter. This pic-ı e shows flexibility of the Hyet and ıuck stanchion upon impact of the lumber.

The same stanchion after sling-load is placed aboard, showing stanchion back to normal position without damage.

Hand Truck with Adjustable Locking Chime Hooks

light-weight, but extremely ıged general purpose hand truck ıow available from General Sci-ıfic Equipment Company, Phila-e hia.

ccording to the manufacturer, ıoutstanding feature of this hand ık is the two chime hooks, which ı adjustable, to lock barrels and e; of different heights securely in otion. Truck is finely balanced so ı most of the load is carried on ı wheels, thus making it easy to sı and handle.

egularly furnished with hollow-e̦er, puncture-proof cushion tires with lug base and Durex self-lubricating bearings, the truck can be equipped with aluminum wheels.

Hand truck

74,000 Pairs of Stockings

The first nylon towing hawser to be placed in commercial use—1,350 feet of sleek, tough 8-inch rope, the largest ever made by Plymouth Cordage Company, Plymouth, Mass. —was recently put aboard the Moran Towing & Transportation Company's 1,200-horsepower Diesel-electric tug *Margot Moran* in New York City.

Weighing more than a ton, the sleek soft-laid hawser contains 2,528,604 nylon filaments—roughly the equivalent of 74,250 pairs of stockings — and is said to have a breaking-point strength of more than 105,000 pounds. Marine experts point out that on this basis the rope should compare favorably with 11-inch or 12-inch manila.

According to factory technicians, the hawser has a 48 per cent elongation to its breaking-point, or a working elasticity of 26 per cent at half load.

Moran operations personnel said that in the offshore work to which the *Margot Moran* is usually assigned, and for which the new nylon product is believed to be especially suitable, the normal (average) pull probably never will exceed 50 per cent of the hawser's rated strength.

To insure stability in the marine service for which it was manufactured, the hawser was factory conditioned by a special process said to represent the equivalent of months of use at sea. A Plymouth representative demonstrated to the crew of the tug and assembled shipping men the approved technique for splicing a thimble into the end of the hawser.

Below: Wrapped coil being unloaded from manufacturer's truck before being placed aboard the tug MARGOT MORAN, moored alongside the bulkhead at Pier One, North (Hudson) River, New York. (Moran photo)

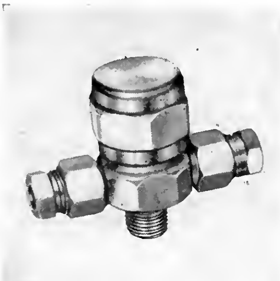
Right: Close-up of coil on deck as crewmen prepared to splice a thimble into one end of the hawser so it could be put into service immediately.

New Lubricator Valve

A new lubricator valve that delivers a positive metered amount of oil or grease to each bearing in lubricating systems has just been announced by Titeflex, Inc., Newark, N. J.

Known as the Grannan Lubricator, it dispenses all lubricants from light oil to heavy greases through the same valve without alteration. It is a fully hydraulic, through flow valve, completely inclosed.

New Lubricator Valve



The Grannan Lubricator is installed directly into the bearing. It does not require special guns to introduce lubricant to system. The lubricator will function either with hand operated guns or from a completely automatic system set to operate at any desired interval. Operating temperature is from zero to 300°F.

Applications for the Grannan Lubricator include trucks, buses, road machinery, mining equipment, farm machinery, machine tools, and other production equipment. It will lubricate up to 500 bearings or more in less than one minute while the machine is in operation, thereby eliminating down time for lubrication and minimizing maintenance costs.

New Fluid Meter Data Available

Bailey Meter Company, Cleveland, Ohio, has issued revised Bulletin No. 301-B, "Bailey Fluid Meters for Steam-Liquids-Gases."

This 40-page booklet is divided into ten different sections discussing, among other things, flow mechanisms, primary elements, integrators, auxiliary recorders, accessories, and installation features. Each section is well illustrated by photographs and drawings of the equipment discussed as well as by diagrammatics which aid in understanding the operation. Also shown are representative chart records taken from actual Bailey Fluid Meter installations.

Bailey Fluid Meters are supplied as indicators or recorders or both. They may also be equipped with a six-unit cyclometer type integrator which counts total fluid flow in gallons, pounds or cubic feet. They are easily adaptable to air-operated control.

Flexible Spring Template

Manufactured by the Flexible Template Company, Camden, New Jersey, the new Flexible Spring Template shown in the picture cuts layout costs and is a timesaver to the marine industry. Instead of making templates from layouts in mould loft, this tool can be set and locked in a few seconds to reproduce desired shape, contour, curve or radius. It can then be placed directly on material and cutting lines scribed quickly. It is also invaluable for all kinds of repair work, especially in confined spaces where template making is extremely difficult.

The template is made in sizes 6, 8, 10 and 12 feet, and is priced at \$3.75 per foot.

Flexible spring template

The Designer Had a Reason for It

(Continued from page 88)

generally set up by foundry practice. The part is complex and the compromises exercised are generally made to assist the foundry in being sure of good sound castings.

The Flywheel

The flywheel concludes the parts of the engine coming under rhe category of main power transmitting parts. The flywheel is a very subtle piece of equipment. Basically its purpose is to smooth out the irregular input of power to a smooth uniform flow. It becomes a governing factor in effecting good speed regulation and paralleling should the engines be applied to generation of electrical power. Design limitations are set up by maintaining reasonable rim speeds and to provide suitable support for the weight of this unit.

The Bed Plate

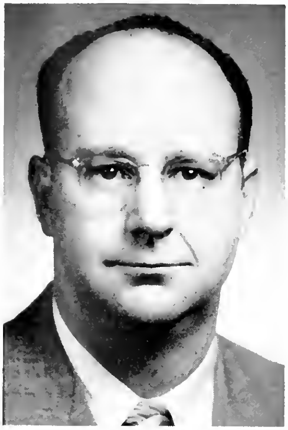
The most important part of the fixed structure of the engine is the base or bed plate. It is functionally the backbone of the engine and, to a great extent, affects the ability to maintain the engine in perfect alignment. It is used to support the crankshaft. It contains the mounting flange on which the complete engine rests, and it acts as a sump for the lubricating oil. Ir is important in considering the base design that it be sriff without adding unnecessary material in order that there may be some weight control.

The Cylinder Block

The main cylinder block, or frame, is generally the most intricate because it is onto this frame thar all other parts, with the exception of the crankshaft, are attached. Unless the engine is extremely large, the crankcase and the cylinders can be made in one unit. With the cylinder head bolted to the top of the block, and the base with crankshaft and bearings bolted to the bottom of the block, the firing forces apparently set up high tensile loading in this center member. Cast iron being a very desirable material for cylinder blocks, and that which is most frequently used, it becomes desirable to provide rugged steel bolts throughout the length of the cylinder block to more adequately withstand tensile loading. Welded steel and aluminum have been successfully used as well as cast iron for cylinder block material. Here again several factors must be considered, such as cost, manufacturing facilities, and noise level. Further, the intended application of the engine frequenrly dictates the most suitable material for the cylinder block. Only a very general frame work can be established by rhe designer at this stage wherein large openings are provided for accessibility to the bearings, and as little limitation as possible is set, in order that, at such time as camshafts and engine mounted accessories are considered, there will be a maximum of freedom for location of these parts.

(This article will be continued in the August PACIFIC MARINE REVIEW)

Bannan President California Metal Trades Ass'n.



Charles F. Bannan

Charles F. Bannan was elected president of the California Metal Trades Association at its annual meeting in San Francisco this June, succeeding to the post held by Joseph Moore, Jr., of the Moore Dry Dock Co., for the past year. Also elected were Cloyd Gray, president of the W. R. Ames Co., San Francisco, as vice-president of the Association, and Roy Tatam, general manager of Western Piping & Engineering Co., as the new treasurer.

Vice president of the Pacific Gear & Tool Works of San Francisco, Bannan has been on the Association's Board of Directors for two years and prior to his connection with the California Association served two years as President of the Washington Metal Trades Association.

Gillespie Transferred to San Francisco

Captain Harold R. Gillespie, Matson superintendent at Wilmington, was recently transferred to San Francisco as Acting Marine Manager. Captain Gillespie takes over the duties of the late Commodore C. A. Berndtson, who died suddenly last May.

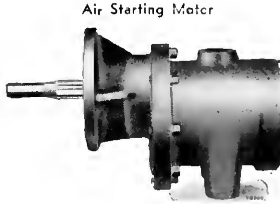
Captain Gillespie is widely known in Pacific shipping. He joined Matson in 1920 and became a master in 1926, his first command being the *SS Makiki*. During the years he served as master of most of Matson's passenger vessels and numerous freighters. He came ashore in 1944 as acting port captain in San Francisco.

Ingersol-Rand Air Starting Motors

Ingersoll-Rand Company is now producing air motors of two sizes as starters for internal combustion engines. The air motor is keyed or splined to the Bendix or starting mechanism and the engine is cranked in the same manner as an automobile engine is turned over when using the electric starter.

The Starting Motors are known as the Size 9 BM and Size 20BM; the former having 9 horsepower and the latter 20 horsepower at 90 lbs. per sq. in. air pressure. They are small and compact having an overall length of only 13 3/16 " and 14½". The air motor is of the "Multi-Vane" type and the Throttle Valve is of the quick opening type to give peak horsepower almost immediately. A single step spur gearing is used to obtain suitable speeds.

Air Starting Motor



Enterprise Announces Two New Vice-Presidents

Announcement has been made of the election of Paul Birchard to the position of Vice President of Enterprise Engine and Foundry Co. Birchard, who has been Works Manager since September 1, 1946, will remain in charge of engineering and manufacturing.

While he has been with the company for a comparatively short period, Birchard has had ample opportunity to become thoroughly acquainted with its manufacturing facilities. When he came to Enterprise on May 1, 1946, he assumed the position of assistant to the Executive Vice President. After just one month he took charge of production at the South San Francisco plant. In August of the same year, he took over as Enterprise Works Manager.

Birchard came to Enterprise with twenty years of experience in the Diesel engine business. During the war years, he served as a Navy Commander, in charge of a navy owned and operated shipyard in the midwest. At the close of hostilities he spent eight months as assistant, in charge of twenty-three shipyards near Seattle. In the years preceding the war he held responsible positions with several leading Diesel engine manufacturers.

Serge P. Kovaleff recently appointed to the position of Vice President of Enterprise Engine and Foundry Company, began his career there in 1926 after graduation from the College of Mechanical and Electrical Engineering, University of California at Berkeley.

Initial steps within the Enterprise organization took him through the positions of Plant Engineer, Assistant Superintendent and Superintendent of the South San Francisco plant. Early in 1936, at his own request, he was transferred to the main office where he first organized the Process Machinery Division, and then participated in general engineering sales activities until the end of 1940, when the Company went through a reorganization to meet the additional load of wartime requirements. He was then made Plant Manager of the South San Francisco plant, expanding employment and facilities, and in 1943 became Production Manager in San Francisco, gradually expanding his responsibilities to General Works Management. His appointment as General Sales Manager became effective in March 1946.

Drew Opens in South America

E. F. Drew & Co. Inc., New York City, have announced the building of a factory for the manufacture of marine power chemicals in Argentina. Buenos Aires is one of the largest ports in the world for the export of foodstuffs to Europe. Many European ships now being serviced by the Ameroid System of Boiler Water Treatment call here, which makes necessary a full service set-up which constitutes so important a part in the Ameroid System.

J. F. McDonough of the Marine Department of E. F. Drew & Co. recently returned from an extended trip to South America. He lectured on boiler water treatment and power plant chemicals before students of the Lloyd Brasilsiro School in Rio de Janeiro, and gave lectures before the executive engineering personnel of Government and privately-owned companies in the Argentina.

American Bureau of Shipping Office in Saudi-Arabia

The American Bureau of Shipping has announced that it is establishing a new office in Saudi-Arabia, with headquarters at Ras Tanura, convenient to the tankship terminals. Peter W. McClen, formerly at the Bureau's Galveston, Texas, office, will be in charge of this Persian Gulf District office. In view of the large amount of tanker traffic developing in this region, it has become necessary for the Bureau to establish representation at this point.

"Unsinkable" Lifeboat

(Continued from page 56)

of London), has been launched at King's Lynn, Norfolk (England). After being on view in the River Thames, she will make the passage to New York, from Falmouth, under her own power by the North Atlantic route. The vessel is fitted with two Coventry marine engines each of 30 h.p., and tanks capable of holding five tons of Diesel oil will give her a cruising radius of 15 days. The equipment of this new lifeboat includes a compass, supplied by Kelvin and Hughes (Marine Instruments, Limited).

Packing Code Urged

Mr. E. H. N. Dowlen, chairman of the Institute of London Underwriters, gives the following reasons for the present widespread pilferage: Insufficient or inadequate packing; delay at the port of shipment; lack of control while loading; pilferage while on board the vessel; insufficient control during discharge; delay in delivery at port of destination; lack of co-operation with police and customs authorities.

In the United States, says Mr. Dowlen, efforts are being made to establish a packing code or standards. He urges the introduction of some similar code in the United Kingdom. If it were adopted, he is of opinion that no merchant could undercut another by means of inadequate packaging; the shipowner, when he saw the hallmark on the container, would know that the goods would be able to stand the strain of the voyage; the underwriter would be able to quote the lowest possible rate for the venture.

Mr. Dowlen was addressing the Institute of Packaging in London.

The Law Changeth

(Continued from page 58)

it in view of the Act's mandatory language.

The *Hust* case held that while the goverment may be technically the employer of a seaman, under the temporary conditions then existing, the common-law principle of employer-employee relationship need not obtain in order for the seamen to recover against the private operator "agent" under the Jones Act and that the mere transfer of vessels from private ownership to government control did not deprive the seaman of any of the settled rights which he had prior thereto. Although there are some statements made in that case which might be relied on as supporting the plaintiff's contention in this case, inasmuch as the Supreme Court has expressly stated that it was limiting its discussion to the Act's retroactive provision and was refraining from making any determination as to the Act's prospective operation, the Court refused to rely upon those statements as governing in any wise the issue in this case.

The Court recognized, for the purposes of the decree, that a petition for rehearing had been filed with the Circuit Court of Appeals for the Third Circuit in the *Aird* case. In the *Aird* case, the general agent was held liable for losses due a radio operator resulting from discharge on the authority of Naval Intelligence. The Court reasoned that the Clarification Act had to be interpreted as intending to permit seamen to assert against the general agent every contract right as well as every tort claim, which they could have asserted against a private shipowner, therefore entitling them to bring their suits against the general agent as an employer. The Court's judgment was affirmed.

George E. Fletcher of Columbia Electric

When we set up the news story last month on Columbia Electric Manufacturing Company's expanding facilities on the San Francisco Embarcadero, we did not have a photo of George Fletcher, partner. Here he is—as happy as the other partner, Ralph Grimes, with their fine new plant at 275 Steuart Street.

Columbia Electric produces panel boards, switchboards and generator control boards.

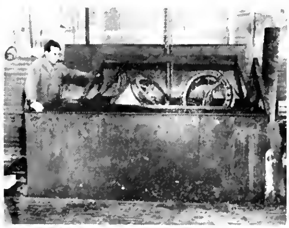
Germain is Associated-Banning President

Directors of the Associated-Banning Company, long-established West Coast stevedoring company, recently announced election of P. H. Germain, Vice President, to the office of President.

Turco Transpo

Turco Transpo, a new, noninflammable, noncorrosive, fast acting, long-lived cold tank material for the removal of carbon, sludge, grease and paint is offered by Turco Products of Los Angeles, Chicago and Houston.

Freer rinsing, Transpo is a two-layer material comprised of a floating chemical seal and a lower layer of potent cleaning agents. Designed to provide peak efficiency at room temperature, there is no need for agitation or heating to maintain its peak the year round.



◄ A Turco Transpo dipping tank in use.

Turco Products Conference

Turco Products, Inc., Los Angeles, assembled its district managers for a two-day home office conference with laboratory technicians and department heads during May. The district managers planned holding similar meetings for their field service organizations upon returning to their respective territories.

A Neat Splicing Job

Not new to the gentlemen pictured but of interest to others is this photo taken in a corner of Roebling's San Francisco plant. Paul Kelly is shown performing a typical splicing operation with Lee Adams, president of C. J. Hendry Co.; Charles Dilke, director of Hendry; Elmer Trask, Pacific Coast Manager of John A. Roebling's, and John Sutthoff of Lumbermen's Equipment Company looking on.

Tanker Converted by Todd

(Continued from page 62)

Upon completion, the vessel was assigned to L'Association Petroliere of Paris for operation for the French Government.

The conversion was one of the most extensive ever performed by Todd on this type of vessel. Some of the features were the transformation of the former cadet room to the owner's room; redecorating of the Captain's room; converting the former gun crew's quarters into a modern dining salon, and refitting the P. O. Mess.

The new Officers' salon is attractively outfitted with light walnut panels covering the bulkheads, fluorescent lighting fixtures, white marinite sheathing on the overhead, a light hardwood buffet and two mess tables, covered with green linoleum connected by a dropleaf to make one long table. Two corner settees, trimmed in light hardwood and covered with green leather, occupy the same side of the salon as the tables, and a third corner settee was installed opposite, with a special small dining table. The room is also equipped with a leather easy chair, 10 leather upholstered arm chairs, and a radio.

The petty officers' mess was also refitted, with two 30′ x 30″ tables, and one 8′x30″ table, and an 8′ settee, similar to the equipment in the officers' salon.

The owner's room was outfitted with a leather settee, wardrobe, desk, arm chair, and Hollywood-type bed, with innerspring mattress, and coil spring.

In the Captain's quarters, the settees and chairs were reupholstered; the mouldings of settees and legs and arms of chairs, the bed boards, two chests, the desk, buffet, and dining table, were all scraped and revarnished and new drapes were installed.

On the bridge deck, where the new salon is located, the former hospital was divided in two, and one-half was converted into a service pantry, with a new electric refrigerator, galvanized steel dresser, running the full length of the room, two stainless steel sinks, electric hot plates and grids.

Room 61 in the former Gunner's Quarters, on the boat deck, was subdivided into three petty officers' rooms, each with a settee, desk, chair, and bed. The former potato locker and gun crew locker, were knocked down and made into a large wine locker, big enough to hold 16 50-gallon barrels, among other items. A new potato locker was built elsewhere on the vessel.

Below decks, all operating equipment came in for an extensive overhaul. The boilers were opened up and cleaned by steam-lancing and compressed air, and the brick-work in each boiler was renewed. The oil burner units were all removed and sent to Todd's Combustion Division in Elmhurst, for overhaul.

All pumps throughout the vessel were opened up; cleaned, and put in perfect shape. The main turbine, and both turbines for the two auxiliary generators, were opened up; their rotors raised for examination, and remachined, where necessary. The main generator was likewise opened up for inspection and repair, to satisfy the requirements of the classification society. A new emergency, 75-KW Diesel emergency generator was put aboard the ship and a new house was built to accommodate it.

The radio equipment was inspected and a number of parts were replaced and spare parts put aboard. A completely new navigation system was installed. The tailshaft was withdrawn and the propellers were checked. It was decided to replace one, and leave a spare wheel on board.

After all of the oil cargo tanks were tested, a number of leaks along the welded seams were detected and over 1,000 inches of new seams were welded on tank bulkheads.

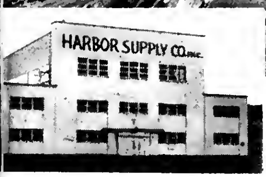
Three deck winches were removed to the machine shop and overhauled; lifeboat supplies were replenished, and all wartime equipment was removed, such as gun tubs, armor plates, etc., and four shell straps or crack arrestors, were riveted across the deck and bottom.

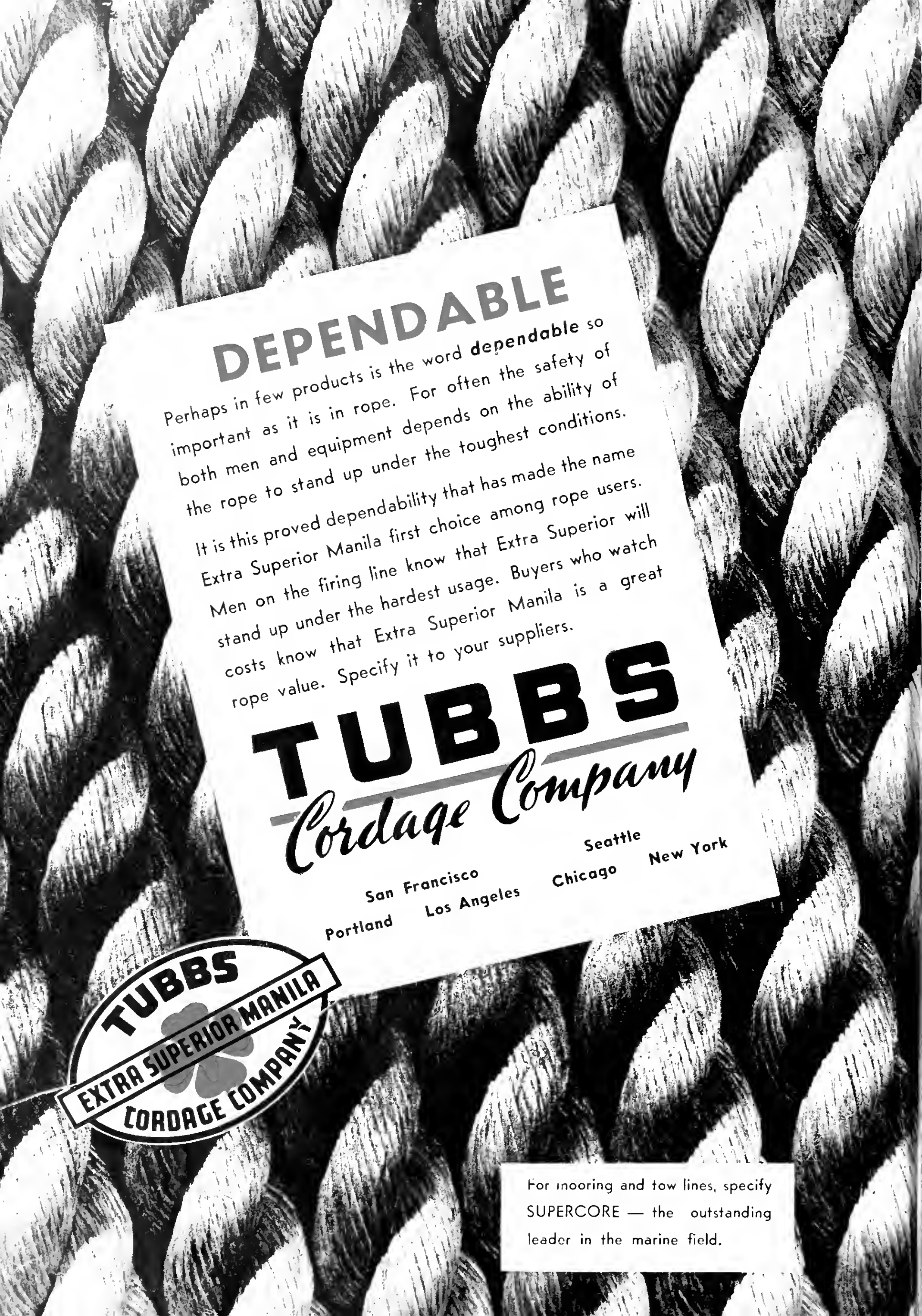
As the final steps in the keel-to-bridge reconversion, the bottom was scraped; the hull was wet-sandblasted to bare metal from 2′ under the light load line to the bulwarks; the superstructure was scraped and wire-brushed, and the entire vessel was repainted.

The *Ardeshir*, flying the new French flag, left the Todd Brooklyn shipyard on May 13, and headed for Curacao to pick up bunkers. She then proceeded to Porto La Cruz, Venezuela, for her initial assignment under charter to the Shell Oil Co.

Pacific MARINE REVIEW

AUGUST 1948




DEPENDABLE
Perhaps in few products is the word dependable so important as it is in rope. For often the safety of both men and equipment depends on the ability of the rope to stand up under the toughest conditions.
It is this proved dependability that has made the name Extra Superior Manila first choice among rope users. Men on the firing line know that Extra Superior will stand up under the hardest usage. Buyers who watch costs know that Extra Superior Manila is a great rope value. Specify it to your suppliers.
TUBBS
Cordage Company
San Francisco
Portland
Los Angeles
Seattle
Chicago
New York
TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY
For mooring and tow lines, specify SUPERCORE — the outstanding leader in the marine field.

Pacific MARINE REVIEW

J. S. HINES
Publisher

B. N. DeROCHIE
Assistant Publisher

T. DOUGLAS MacMULLEN
Editor

B. N. DeROCHIE, Jr.
Assistant Manager

DOROTHY GRAVES
Assistant to Editor

PAUL FAULKNER
Pacific Coast Advertising Mgr.

DAVID J. DeROCHIE
Assistant Los Angeles

GEORGE W. FREIBERGER
Advertising Mgr. San Francisco

LOS ANGELES OFFICE
943 Wilshire Blvd., Beverly Hills
Telephone—BRadshaw 2-6205

SAN FRANCISCO
Telephone—GArfield 1-4760

Member Audit Bureau of Circulations

Subscription rates:
One year, $2.00; two years, $3.50; three years, $5.00; foreign, $1.00 additional per year; single copies, 25c.

TABLE OF CONTENTS - - - - - - AUGUST, 1948

More Profits, Please;

And Better Public Relations

THE PROFITS of today's business are the expanded payrolls, increased production and lowered costs of tomorrow. An unprofitable business, or a low profit business does not expand; it cuts down. It does not improve its products; its cheapens them. It does not increase employment, or lower prices; it is not an asset to the country. It has little to tell the world, so it stops its advertising and public relation programs and soon folds up.

There are those who argue that profits of manufacturers are responsible for high prices, but if all the corporate profits of 1947 were applied to price reductions, the result would be less than 6% difference in consumer's ultimate bills—and there would have been a cessation of development, expansion and research, and also in the accumulation of reserves for non-profitable years. Those who criticize the profit system are the first to yell if lay-offs come.

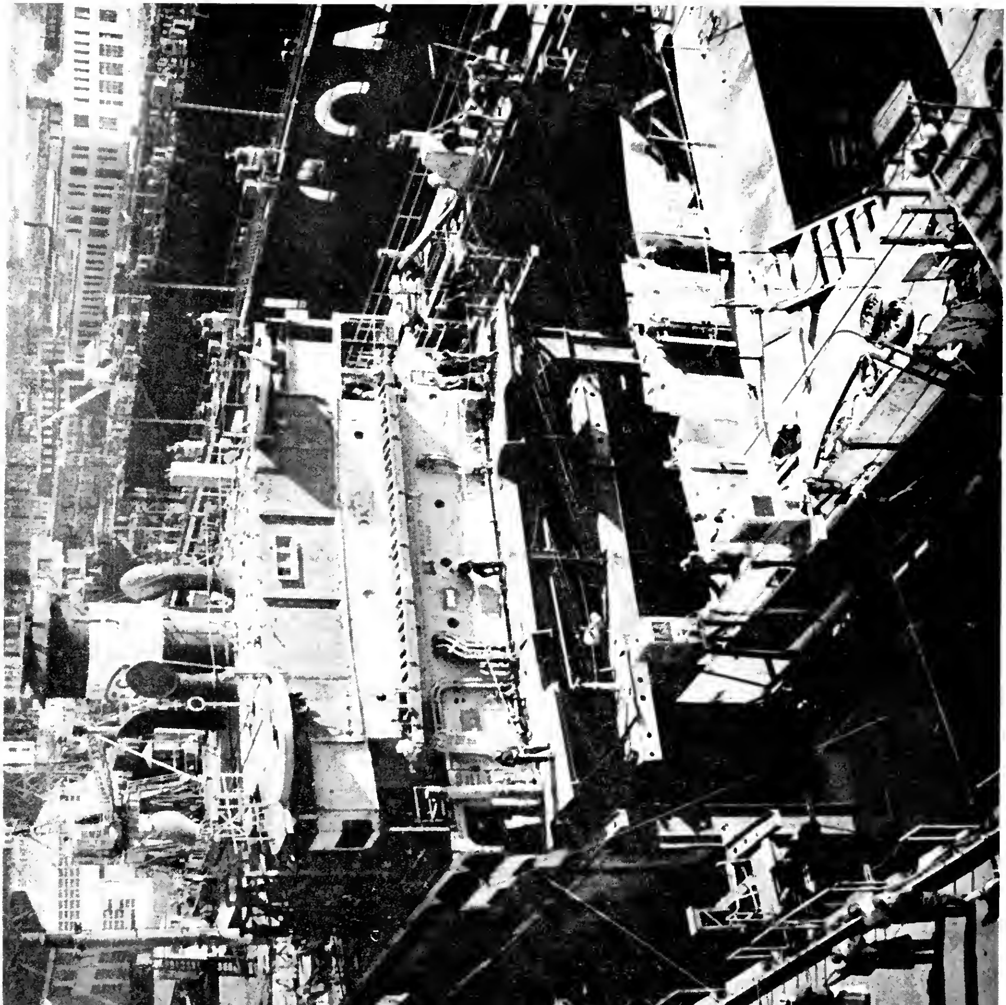
So its brings satisfaction to note that the review of U. S. Steel's report shows what they did with their earnings, including an increase of nearly 10,000 in the number of employees this year over last year.

Many firms try to show how little was set aside as reserve, or paid as dividends. They really have no reason for concealment, but rather should explain to their customers, employees and the general public that profits are the means of progress. It is the *lack* of success or profit that should be explained.

If the public thinks ill of any firm, it is a reflection on the public relations of that firm. If its products and policies are sound, it should tell the world about them and boast of its success. America is built on the successes of its citizens and the progress of its business. The heroes of industry are those who have built great businesses on which our high standards of living have grown, including those in obscure positions who struggle in behalf of their ideas and ideals above and beyond the call of duty.

The relations of any industry to its public should be intimate and clear, so that when it needs public support it will be readily available. A great, vital industry such as shipping needs an earning capacity just as any citizen does. The pride of the Nation in its shipping, as in its indusrrial might, should be marshaled in behalf of the prosperity of every unit, and this calls for a job of public relations in which every firm should have a part.

There is no city, counry or state whose welfare does not "profit" in some degree from shipping, and we cannot let pass the statement of an industrial traffic manager at a recent San Francisco convention that steamship companies try to raise rail rates so that ships can raise also. He should know that rail rates are deliberately depressed to port cities on *account of* lower ship rates. It is the part of good public relations to keep the public informed on matters on which profitable operations depend. The public will understand and respond.



Liberty Ship Shortened Thirty Feet

A REPAIR JOB of more than usual interest has recently been completed at the Boston Yards of the Bethlehem Steel Company—the conversion of a standard EC2, Liberty vessel, the *Janet Lord Roper*, to a collier named the *P. W. Sprague*. In addition to the major structural modifications involved in such a conversion, the vessel was shortened by thirty feet to permit mechanical unloading of all hatches by existing gear, at short piers, without shifting the vessel during the process.

The section of the vessel between frames 70½ and 80½, immediately forward of the deckhouse, was designated for removal in its entirety. Two methods of joining the two sections were investigated. The first was to build shipways under the forward section and to jack it back to meet the after end. The second method, which was ultimately adopted, was to sink the dock and float the more stable after section toward the forward section. The alignment problems of either method of joining made it necessary to carry out this operation on a con-

◀ Overall view of P. W. SPRAGUE taken before the ends had been joined, looking aft.

tinuous wing-wall floating dock, or in a graving dock.

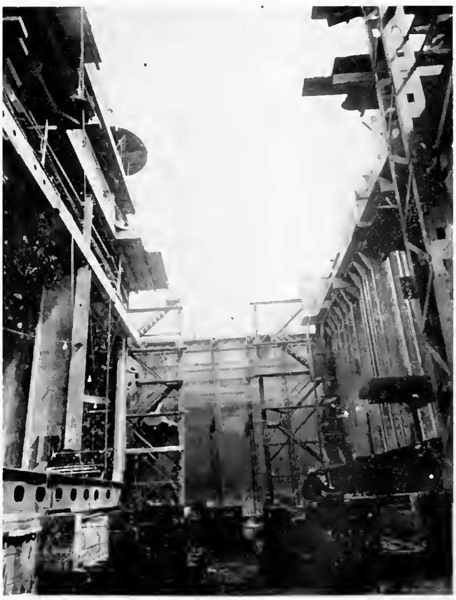
The 20,000 ton floating dock at the Boston Yard is ideally suited for a job of this type because of its continuous wing-wall construction, maneuverability, and crane facilities, which, along with two large pier cranes, permitted the quick, efficient dismantling of the thirty-foot section.

The vessel was placed on dry dock on April 6 and the removal of the section commenced immediately. The main deck was removed in one section, each side in two sections, and the entire inner bottom in two large sections weighing about 40 tons each. These heavy lifts were made by bridling two pier cranes together with an equalizer. The entire task of cutting and removing the section was accomplished in 2½ days, including the final trimming cuts.

The next step was the actual joining of the two sections. Holes were cut in the after bulkhead at frame 68 of the forward section to allow No. 2 Hold to flood freely, and the fore peak and forward deep tanks were filled, anchoring this section firmly on the keel blocks. Two long I-beam guides were welded on the after section with angle-iron stops located so as to bring the two sections within 17½ inches of actual abutment in accordance with the plans. Vertical alignment of the keel was assured by the construction of extensive cribbing under the bottom. The control of the after section, as well as the actual hauling, was exercised through a system of blocks and wires led to the electric winches on the dry dock wing-walls. Transit targets for checking the alignment of the two sections during the joining operation were set up at several points on the after section of the vessel. The after portion of the vessel was ballasted, so that it would float on even keel while being moved.

The joining operation was carried out on a freezing

After cut, before sections had been brought together. After end at left, forward end with bulkhead No. 68 at right. This bulkhead had holes cut in it for flooding the forward section and was removed later. The inner bottom and vertical keel are shown, with the guides welded on the keel on both sections. Blocks and cribbing insure correct alignment in the vertical plane.



cold day with a wind so strong that upon floating free of the keel blocks, the after section assumed a definite heel to port. However, this heel was quickly corrected by a transfer of ballast in an amount easily determined by the stability data which had been computed, in advance, for the after section. When the dock had been lowered until the after section was afloat about 6" over the keel blocks, this section was pulled forward into place. After a short period of checking alignment and making the necessary changes of position, the dock was pumped up with the two sections ready to be permanently rejoined.

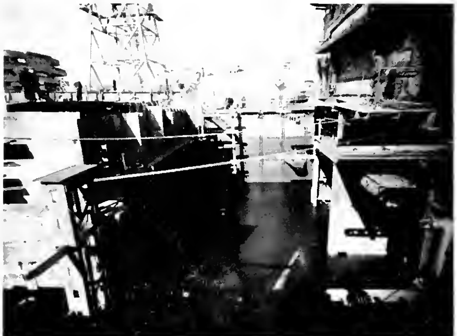
The final phase of rejoining was the plating-in, which was carried out along conventional lines. However, the difference in sheer heights at the joining (about 6"), due to the shortening of the ship, required a special design for the filler pieces used on the side shell, the adjustment of bulwark heights to provide a pleasing sight edge, and a realignment of main deck plating for several feet forward of the junction of the two sections. The original construction, using riveted seams and welded butts, was followed where new plating was fitted at the junction.

While the shortening of the ship was the most spectacular feature of the conversion, many other major alterations were also required. In addition to the removal of military features, machinery overhaul, and renovation of quarters, the basic structure of the ship was changed to suit its use as a collier.

The second deck was removed, except for a portion four feet wide along the shell to act as a stringer. To this, a heavy channel was welded as a face bar. Centerline hold bulkheads were removed.

Eight deep transverse webs were fitted between the new cargo hatches; this addition permitted hold stanchions to be removed, and increased the transverse strength of the vessel. The assembly of these web frames was carried out at the Bethlehem Quincy Yard from templates furnished by the East Boston Yard.

The original cargo hatches were removed and the main deck was altered for the installation of 10 new hatches, complete with hinged steel covers and 14 kingposts. Hatch covers and kingposts followed closely the "Seam" class design. Four of the original cargo winches were altered and relocated between hatches 2 and 3 and 7 and 8 for raising and lowering the heavy covers. The assembly of the covers and kingposts was also accomplished by the Quincy Yard. The new hatches, although similar to the standard collier type, are not a part of a trunked deck. Consequently, in order to keep the main deck free of obstructions and to avoid extensive piping alterations in the living quarters due to the widening of the hatches, all deck steam and exhaust



Top: Picture after flooding. After end at right. The wire rope used in pulling the after end into the forward section may be seen in this picture.

Center: The gap between the two sections about half closed. The I beam guides, two on each side, and rigging are also shown. On the lower guide may be seen the angle welded on to stop the section at the correct distance. A similar stop on the upper guide is barely visible. The lower wire rope which runs at nearly 90 degrees to the shell was used for horizontal alignment.

Bottom: The two sections brought into proper alignment and at the correct distance from each other. When this picture was taken the after section, at right, was still afloat, and therefore is somewhat higher than the forward section, which rested on blocks.

piping and all electric lines were reinstalled under the main deck.

Further strengthening of the vessel's hull was carried out by the installation of a riveted strap 48″ wide along the sheer strake, a welded 46″ strap along the main deck stringer plate, and welded doublers extending from 12″ inboard to 24″ outboard of the hatch coamings. A transverse doubler 16″ wide was also fitted over each new web frame, between hatches, as reinforcement for the upper flange of the web.

Changes and additions to the ballast system were also a large part of the conversion. The portable covers on the deep tanks in No. 1 hold were removed, the tanks plated over permanently, and heavy wood ceiling installed on the new tanktop. New ballast tanks were constructed in No. 4 and No. 5 holds by installing, at the level of the shaft tunnel top, a new tanktop of 1″ plate with heavy stiffening to withstand the shock of the unloading bucket. To service this enlarged ballast system, a 2500-gallon-per-minute, steam-turbine driven rotary pump was installed in the engine room.

Since the vessel is to be used mainly in the coastwise trade, No. 3 hold was enlarged by shortening the bunker deep tanks immediately aft of the engine room a distance of three frame spaces. However, to allow offshore cruising, the No. 2 inner bottom tank was piped for fuel oil as well as ballast.

The vessel's superstructure was altered by cutting back the bridge wings to prevent damage alongside high loading piers and new pilot house windows were installed. The four lifeboats were replaced with two 43-person aluminum boats on quadrant-type davits. In the galley, the old coal range was replaced with a modern oil-burning range. The ship was also equipped with commercial radar.

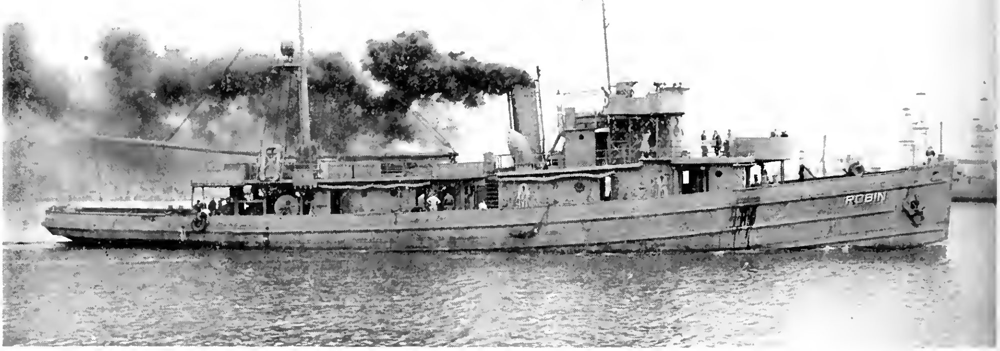
Upon completion of the conversion, an inclining experiment was performed followed by a four-hour dock trial and an eight-hour sea trial. The ship was then delivered three days ahead of the contract time of 70 calendar days to the Sprague Steamship Company of Boston for their regular service between Hampton Roads and New England ports.

Plans and specifications for the conversion were prepared by Theodore E. Ferris and Sons, Naval Architects of New York.

The following is a comparison of some of the characteristics of the vessel before and after the conversion:

	Original Vessel	After Shortening
Length between perpendiculars	416′0″	386′0″
Beam, moulded	56′10¾″	56′10¾″
Depth to top deck, moulded	37′4″	37′4″
Draft moulded	27′7″	28′3¾″
Displacement	14,150 tons	13,280 tons
Gross Tonnage	7,176 tons	6,050 tons

P. W. SPRAGUE after completion of conversion.



The ROBIN leaves for one of history's longest tows.

Tow to India

SAN FRANCISCO was the starting point for one of the longest tows in history recently when the tug *Robin*, towing a scow and dredge, passed through the Golden Gate on the first lap of a 12,000 mile voyage. The equipment will be delivered to the Okha Harbor Board in Baroda, India, 325 miles north of Bombay. Going out the Gate the *Robin* had the scow 1,000 feet behind it and the dredge *Texas* 500 feet behind that, on separate cables as well as connected cables.

All this began when the Maharaja of Baroda, said to be the second richest man in the world, decided to improve his port of Okha, and through his counselor, picked Jean Allen, 70-year-old Los Angeles engineer, to supervise the project. Allen went to India to survey the port of Okha which is a good-sized niche in the coast between Bombay and Karachi and needs a good approach channel between the island and the mainland.

Allen's experience is impressive. He built pier 7 in Manila, worked on various stages of the Panama Canal, the New York barge canal and many others, and is a big independent dredge designer. When the war broke out he was surveying the Seine for widening and straightening.

The tug *Robin* is an ex-Navy minesweeper of 1400 horsepower. Two days out of Manila when war broke out in 1941, she cleared safely to Honolulu, serving the remainder of the war in the South Pacific. She was decommissioned in October 1945. The De Valle Equipment Company of Los Angeles, represented by Tad Travers, sold the tug to the Baroda government.

Allen obtainel the clamshell dredge *Texas* from War Surplus. The *Texas* was designed by Allen in 1930, and built at Marietta Iron Works, Marietta, Ohio. For many years it was used in Gulf of Mexico work and then the Army took it over for operations in Greenland; then Albany, N. Y.; then Honolulu. It has a capacity of five

cubic yards. The dump scow has a 500 cubic yard capacity. The job of delivering the equipment to Okha was turned over to the Walter Johnson Company, San Francisco, of which W. E. Kirby is agent.

Refueling is being done at sea as far as Singapore. The steamer *Fermina,* owned by the Walter Johnson Company, is the tanker ship. She was formerly the American gunboat *Sacramento.* The *Fermina* itself has a tow, the *SS. Angel Island* which formerly ran between the immigration station on the island and a Marina pier. The *Angel Island* is now called the *SS. Clavecilla,* after Paul Clavecilla, Kirby's Filipino partner.

Thus, it is a five-ship convoy, three on one string and two on the other. The *Fermina* and her tow left a few days after the *Robin* but soon caught up to her.

Refueling at sea will be done the Navy way—two ships running parallel, at the same speed, hosed across. To increase the *Robin's* carrying capacity, magazines were replaced by bunker tanks. Kirby is preceding the convoy to arrange at various Pacific ports for the *Fermina* to pick up oil to transfer to the *Robin.*

At Singapore the *Fermina* will be fixed up for a passenger-freight run from the Philippines to Hongkong, and the *Clavecilla* will be dropped off at Manila to become an interisland steamer.

The convoy will fly three flags. The *Robin* is registered as Costa Rican, the dredge *Texas* is registered Indian, and the *Fermina* is Philippine.

Skipper of the *Robin*, Captain Ernest O. F. Hanson, and chief engineer Erwin Mackey hope to arrive in Okha in four months at an average four knots. Allen did not go along with the tow but will meet it in India. The crew of 33 aboard the *Robin* and eight aboard the *Texas* are made up of Filipinos, Indians, Indonesians, Hindus, Syrians, Chinese—and a Harvard graduate. Most of the crew will remain with the *Robin* after arrival, operating the tug in port.

Left to right: Tad Travers, W. E. Kirby, Jean Allen, Capt. E. Hansen.

View of the ROBIN, scow and dredge TEXAS before they left Moore Drydock West Yard.

The 6,856-ton Polish freighter PULASKI, lying at a berth in the Hoboken division of Todd Shipyards Corp.

Coal to Oil

THE GDYNIA-AMERICA LINE passenger-cargo vessel *Pulaski* recently underwent a four-month remodification at the Todd Hoboken shipyard. Major changes were the conversion of her boilers from coal-burning to oil and a complete revamping of the midship house to provide accommodations for twelve passengers. The conversion from coal to oil was described in the December 1947 issue of *Pacific Marine Review*, and has now been completed.

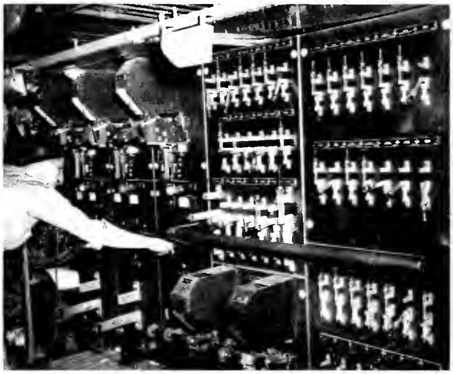
Built in Germany in 1928, as the *Leuna*, the *Pulaski* was equipped with five coal-fired Scotch-type boilers with three furnaces for each boiler. Fifteen Todd fuel oil burners were installed in the furnaces, together with the oil heating, pumping, straining, and storage facilities.

All of the vessel's machinery, motors, and utility systems were opened up for inspection and overhauled where necessary to comply with her regular annual Lloyd's survey. The tailshaft was likewise withdrawn and the rudder lifted for examination. New generators, water condensation units, switchboard, and refrigeration equipment were installed.

The new passenger accommodations were equipped with handsome, new modern, mahogany bunks, with draw curtains, wardrobes, dressers, and settees. The officers' messroom was remodeled with new tables and aluminum frame chairs to become the passengers' salon. Additional crew quarters were provided aft and a new crew recreation room was built.

All of the passenger and crew spaces were repainted, refitted, and refurbished, and the outside of the vessel came in for a bottom scraping and hull painting. The *Pulaski* took on cargo at New Orleans and sailed thence to her home port of Gdynia, Poland.

Among the engine-room repairs and replacements was this new switchboard (Standard), to control the current from three new 60 K.W. turbine-driven DC units (Westinghouse) replacing 43 KW generators.



The boiler room, spic and span, after the oil-burner installation (Todd "Hex-Press" mechanical pressure atomizing fuel oil burners). 15 burners were installed on the 5 Scotch-type, Howden forced-draft boilers. Also installed were fuel oil storage, pumping, heating, and straining equipment.

Boiler room of the PULASKI before conversion, showing five Scotch-type boilers with three furnace doors each. The two coal piles are typical of a coal-burning boiler room. In this case, two of the furnaces are still being coal-fired to maintain essential services on the vessel.

Seaplay

The Year's Outstanding Houseboat Cruiser

RARELY HAS SUCH PERFECTION IN BOATS graced the cruising waters of the United States, and it would be difficult to find a more perfect achievement of the designer's art and the yacht builder's craft than George W. Codrington's new houseboat yacht, *Seaplay*, at Daytona Beach Florida.

But mere size does not make a yacht ideal—she has to embody a combination of all the elements of skills of the naval architect, the builder and the machinery manufacturer. Seaworthiness, sleek lines, good turn of speed, ease of handling, sturdiness, compactness with comfort, reliability, and ability to go anywhere her owner desires must enter into her design and construction. She must have the maximum of accommodation and equipment for her overall dimensions, and every cubic inch of space must serve a functional purpose, and, all these features must be adapted to the owner's special ideas and requirements. The *Seaplay* is distinctive in that she meets all these tough specifications. She is different in many ways from the average houseboat cruiser in that common sense is an important part of her entire design.

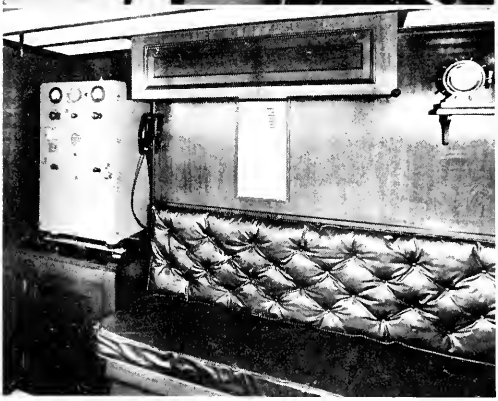
George Codrington happens to know what constitutes a really good boat. He spends many of his business hours aboard commercial and pleasure vessels, and also is a successful work boat builder in his own right. To his own extensive and practical sea-going experience, Codrington has added that of an old-time yacht builder—John Trumpy of Annapolis—who built the *Seaplay* with the result that he now has a craft which is commanding exceptional attention in every yacht club harbor visited.

The *Seaplay* is commodious for her size, which is 80-feet over all, 78-feet on the waterline with a beam of 18-feet. Her normal cruising draft with fuel, water, stores, passengers and crew aboard is 5-feet, so she can traverse comparatively shallow inland waterways, or be perfectly safe in open water during a blow. Her ordinary cruising speed is 12 knots, but she has a top speed of 13.4 knots, which is ample for the purpose of an owner who would like to relax and take things leisurely whenever possible.

Construction of the yacht is grade 100 A-1, with heavy members and framing of white oak, and long-leaf yellow pine planking fastened with bronze screws. The deck, deckhouse and trim are of teak, and two watertight bulkheads divide the hull into three sections.

One of the first features of the design to catch the eye is the unusual layout of the pilot house, this being

The SEAPLAY, George W. Codrington's new cruiser.



Top: Main cabin of the SEAPLAY showing lounging and dining facilities. Companionway at rear right leads to sleeping cabins; door in rear center to aft lounging deck.

Center: Owner's room just forward and slightly below the pilot house of the SEAPLAY gives exceptional visibility and makes excellent business headquarters.

Bottom: Ship-to-shore telephone in the owner's room makes possible instant communication with home or office from the SEAPLAY.

Top: Comfortable and commodious aft lounging deck of the SEAPLAY.

Center: Owner's cabin of the SEAPLAY. Appointments include twin beds, built-in dressing table, private bath and full length clothes closets.

Bottom: Forecastle of the SEAPLAY showing bunks for seamen and the chef. The captain and the steward occupy private cabins at the left.

partly lifted over the deckhouse with a dropped floor and stepped back about 9 feet from the forward end. Not only does this streamlined arrangement give the navigator an unobstructed view ahead, but it enables the owner to have his favorite "above deck" room given a similarly unobstructed view, without the same being blocked by the usual pilot house.

This particular compartment is an observation room deluxe, but used by the owner as his office when his pleasure hours are interrupted by important business communications coming over the ship-to-shore telephone. He is never out of touch with his office.

The dropped floor of the pilot house prevents the superstructure being top heavy in appearance and adds to the graceful lines of the hull, at the same time reducing wind resistance. The space between the deck and the pilot house and the main deck is used for storage and for the cooking gas tank, while a part of it gives extra headroom to the galley below. This is just one example of the great care taken to create and utilize space. The bridge wings on either side of the pilot house are a feature new to yachts, and enhance the appearance as well as adding utility. The main engines are controlled from the pilot house by means of control mechanism, providing the captain with instant response from the propellers without signaling below.

Aft of the stowage space is the pantry, a toilet and stairway down to the galley. Next aft in the deckhouse is the owner's combination living room and dining saloon, a spacious compartment some 23-feet long, tastefully decorated and comfortably furnished with deep armchairs and settees upholstered in soft color tones with heavy pile rug to blend. There also is a dining table, three buffets, and floor lamps. As consistent with a houseboat type of yacht this room has large windows.

The after deck also is very comfortable and roomy, with a wide upholstered seat across the stern, and adequately furnished with wicker arm chairs and a table. Windbreak doors are built in the after deck corners, providing protection during cool or inclement weather conditions.

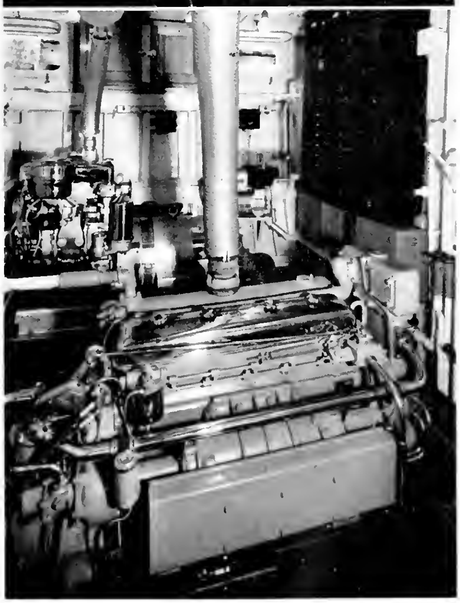
A companionway in the dining room leads down below to the owner's and guests' quarters. The owner's double stateroom is 11-feet by 16-feet with connecting bathroom and electrically operated toilet at its forward end to the starboard of the entrance passage. There are two beds, one on either side of the room; a large dressing bureau and two wardrobes. The portlights in this and other cabins are of special Trumpy rectangular design and slide fore and aft. They are fitted with blinds in back of the side panels.

On the port side of the passage leading to the owner's stateroom there is another bathroom which services the guests' accommodations. On the starboard side of the hull is the larger of the guests' two staterooms, this one having two beds, while the other guests' room is on the port side and has one bed with a Pullman berth above. Both cabins have large wardrobes, bureaus and chests of drawers, and are most attractively furnished. Everything has been arranged in these staterooms to give the

(Please turn to page 82)

Top: Pilot house of SEAPLAY contains controls, providing the captain with instant response from the propellers without signaling the engine room.

Bottom: Engine room of SEAPLAY contains two General Motors Diesel engines of 200 b.h.p. each for main propulsion of the twin propellers and a 10 k.w. General Motors Diesel auxiliary generator set for electricity.



Port Authorities Convention

Pacific Coast Association Meets at San Francisco

IN ADDITION to some very strong and well prepared addresses on port affairs, the thirty-fifth annual convention of the Pacific Coast Association of Port Authorities developed several matters of great importance to the future of West Coast shipping. The convention was held July 15, 16 and 17 in San Francisco's Fairmont Hotel. The strong points referred to were the proposal for the solution of work stoppages on the piers and the emphasis placed on national defense as related to port activities. More on both of these matters a little further on in this article.

The convention was described by its officers as the best attended and most productive the Association has ever held. The convention might be called remarkable for a strictly personal reason. This would be found in the precision and efficiency by which president Thomas Coakley handled the affairs of the meeting and with which the other officers and committees conducted their affairs.

◀

At the 35th annual convention of the Pacific Coast Association of Port Authorities, San Francisco.

Top, left to right: Albert Gatov, president, Pacific American Shipowners Association; General Robert H. Wylie, manager, Port of San Francisco; Thomas Coakley, president, California State Board of Harbor Commissioners and retiring president of the Association; J. A. Earley, president of the Seattle Port Commission and newly elected president of the Association; James S. Kearney, president, I.L.W.U., Local 10; Colonel Warren Lamport, manager, Port of Seattle.

Center, left to right: Colonel John Kilpatrick, operating manager, American President Lines; William Geary, chief wharfinger, San Francisco, and superintendent of San Francico's Foreign Trade Zone; Charles L. Wheeler, executive vice president, Pope & Talbot; M. D. McCarl, port manager, Redwood City; Captain Lloyd Hughes, traffic manager and assistant port manager, Port of Oakland; Robert K. Hunter, traffic manager, Port of San Francisco. Bob left this position with the Board of Harbor Commissioners August 1 to become a legal examiner for the California Public Utilities Commission.

Bottom, left to right: C. S. Sampson, president, Board of Harbor Commissioners, Los Angeles; Claire V. Goodwin, president, Oakland Port Commission; Eloi J. Amar, port manager, Long Beach; Lloyd Fleming, Pacific Coast Director, U. S. Maritime Commission; Colonel T. J. Weed, executive officer to Chief of Transportation, U. S. Army; Arthur H. Abel, port manager and chief engineer, Port of Oakland; F. G. Tegtmeier, president of the Everett Port Commission.

Coastwise and Intercoastal Trade

A panel discussion on coastwise and intercoastal trade was led by Mark Gates, veteran secretary of the San Francisco Harbor Board. Participating in the discussion were Charles L. Wheeler, executive vice president of Pope and Talbot, and James S. Kearney, presidenr of International Longshoremen and Warehousemen's Union, Local 10. Wheeler's analysis of domesric shipping and recommendations for its future were impressive, and Kearney's obvious interest in the continuation of these services was highlighted by his prediction of a decreasing number of waterfront strikes. He described "political and troubleseeking" pier disturbances and attributed the changing relationship between the United Stares and Russia as one of the major factors influencing the unions against such strikes. He said that the change in the international picture has strengthened the hands of men in the union movement who understand the destruction and foreign-motivated objectives of communism.

One other speaker at this panel, L. H. Wolters, trans-

Speaker at the luncheon, M. J. Buckley, senior vice president, American President Lines, who discussed the economic relationship with Asia.

portation manager for the Golden State Company, referred to the diversion of traffic from West Coast ports and placed the blame, in part, on transportation companies. There is some reference to this opinion in the editorial on Page 27 of this issue.

Airports

There was considerable discussion of airport matters but we will not review this subject here. Airports enter into port activities because several major port commissions manage their cities' airports as well as harbors, and the air lines are becoming increasingly significant in offshort transportation. The airport discussion was led by Arthur H. Abel, port manager and chief engineer of the Port of Oakland, and included addresses by J. G. Bastow of the Port of Oakland, George T. Treadwell of the Port of Seattle and H. E. Squire of the Port of San Francisco.

Reduction in Terminal Operating Costs Through Design and Planning of Facilities

The panel on this subject, led by R. R Shoemaker, chief engineer of the Port of Long Beach, produced some of the most forward-looking ideas of the convention.

Captain Earl Manning, traffic manager at Long Beach, had a lot to say about the design of piers and pier approaches and he offered constructive criticism of the older piers in various West Coast port cities. He suggested that the following conditions should be met wherever possible:

All cargo activities from and including car unloading to the ship's hook must be under the direct control of the terminal superintendent.

Transit shed must be large enough to properly as-

Top: Informal dancing following the dinner in the Gold Room, Fairmont Hotel.

Bottom: Head table at the luncheon. Guests included many prominent figures in government and shipping.

Newly elected officers of the Association. Left to right: Warren Lamport, Seattle, secretary and treasurer; J. A. Earley, Seattle, president; C. S. Sampson, Los Angeles, vice president; Martel Wilson, Stockton, vice president.

semble cargo for ultimate loading, either inbound or outbound.

Palletization should be fully utilized along with the use of attendant mechanical stevedore equipment.

Pillar free transit sheds with not less than 20 feet overhead clearance.

Aprons not less than 20 feet in width and proportionately larger when with tracks.

Single deck doorways approximately 15 feet high so placed as to best meet discharging and loading operations, again both inbound and outbound.

Independent track service.

Independent roadway with truck loading platform.

Cold storage facilities for intransit storage.

Sufficient freeways and arterials serving the port from inland areas.

Establishment of major traffic streets well back from Harbor area but essentially parallel to the waterfront.

Parking areas reasonably close to site of work.

Development of local street parallel to terminals adequate to handle port traffic.

Where lighterage or bunkering is to be utilized, the width of the docks at cargo finger piers is of utmost importance and should so be considered in the planning.

Close proximity of stevedore facilities and gear to terminal.

While there are innumerable additional items which go into the planning of the ideal terminal such as lighting, fire detection and fire fighting equipment, smoking areas, special cargo lockers, etc., the aforesaid items cover generally the requirements for direct handling of cargo.

The following description and dimensions are of a structure and berth best suited to fulfill the requirements set forth.

400 feet minimum depth of area at right angle to pier lead line.

600 feet length of transit shed and berth.

200 feet width transit shed.

15 feet height of doors.

Single deck construction.

Floor—asphaltic concrete.

600 pound load limit per square foot.

20 feet minimum vertical clearance in transit shed.

15 feet height of floor from mean tide water line.

* * *

Colonel John Kilpatrick, operating manager of American President Lines, dwelt especially on mechanical equipment and containers on the piers and on the relative efficiency of stevedoring activities.

Oakland Day

Representatives of forty ports were welcomed by the Oakland Board of Port Commissioners to an Oakland Day celebration at the Claremont Country Club on the first day of the Convention.

Claire V. Goodwin, president of the Oakland Board of Port Commissioners, presided at the luncheon. At the head table with him were Mayor Joseph E. Smith; Thomas Coakley, president of the association; James H. L'Hommedieu, president of the Oakland Chamber of Commerce, Ingraham Read, Oakland publisher, and Clifford D. Allen of the Oakland Board.

After lunch many of the guests took advantage of conducted tours which visited some of the outstanding points of interest in the bay area, including the Port of Oakland, Oakland Army Base and the Naval Supply Center.

M. J. Buckley

Any convention that can attract as a principal speaker M. J. Buckley, senior vice president of American President Lines, must have something worthwhile. Buckley's speech on the economic relationship between the United States and Asia was one of the high spots of the convention. His experience with shipping on the Pacific goes back to beginning of the century and he has seen many comings and going in the Merchant Marine. Just returned from an extensive tour of the Orient, he pictures that vast area as one of opportunity and of responsibility for American shipping.

Picture taken at Port of Oakland Day at the Convention.

Left to right: C. S. Sampson, President, Los Angeles Harbor Board; Claire V. Goodwin, President, Oakland Board of Port Commissioners; George La Roche, Port of Portland; Arthur Eldridge, Manager, Port of Los Angeles, Thomas Coakley, President, Pacific Coast Association of Port Authorities.

Closing his descriptive address with a discussion of port management, Buckley added:

"We like to describe the Pacific Coast as the land of opportunity and the gateway to the Far East. We have the means, financial and otherwise, the equipment and the energy to make this area probably the outstanding factor in the full development of Asia and our own national hopes and aspirations. We in the West face the setting sun. We have been proud of that distinction and its glamourous implications. There is a sense of requiem, however, in that expression and I hope that through delinquence, neglect or inability to grasp opportunity as it offers, our own sun doesn't set in the obscurity of failure. We don't need rest. We need action."

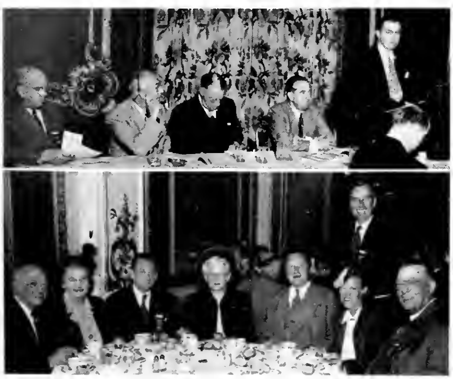
Important panel discussions on "Promotion of waterborn commerce through the Pacific Coast area," participated in by J. E. Lowden, John E. Cushing and George LaRoche under the chairmanship of Robert K. Hunter, and on "National defense as related to port authorities," participated in by Colonel T. J. Weed, Colonel Warren Lamport and Captain A. H. Richards, under the chairmanship of General Robert H. Wylie, were too important to condense in this issue and we will carry them forward into the September *Pacific Marine Review*.

Resolution on Labor Relations

In closing the convention the resolution enthusiastiastically adopted on the above subject and which is quoted below, led the delegates to feel that their convention had produced a constructive idea which might offer benefits running far into the future. The Resolution: "WHEREAS, the most important subject that has come before the Thirty-fifth Annual Convention of the Pacific Coast Association of Port Authorities is the matter of uninterrupted shipping services; and WHEREAS, the peaceful relationship between employer and employee in the shipping industry is the most important factor in assuring such uninterrupted service; now, therefore, be it RESOLVED; that the Pacific Coast Association of Port Authorities hereby petitions the respective mayors of the port cities of the Pacific Coast to appoint a committee in their communities composed of representative citizens of all walks of life to lend their best efforts to formulate a program to insure peace in the industry; and be it further RESOLVED; that the President and immediate past President of the Pacific Coast Association of Port Authorities hereby are charged with the duty of taking such steps as may be necessary to effectuate the purpose of this resolution."

Top: The closing session of the convention with committee chairmen about to report. Left to right, Arthur Abel, Arthur Eldridge, George Osgood, Claire Goodwin, and president Tom Coakley.

Bottom, left to right around the table: Mark R. Colby, Mrs. George W. Osgood, Lawrence Dake, Mrs. Mark R. Colby, Oliver D. Colvin, Mrs. Lawrence Dake and George W. Osgood.



THE TWIN LAMPORTS

Warren D. Harry B.

Retiring President Coakley and incoming President Earley made immediate plans for the carrying out of the resolution.

Election

James A. Earley, chairman of the Seattle Board of Port Commissioners, was elected president for the year 1948-49, and Seattle was named the convention city for 1949. In addition to Earley, officers were elected as follows:

Vice presidents, C. S. Sampson, Los Angeles, and Martel Wilson, Stockton; secretary-treasurer, Warren Lamport of Seattle. Directors: Robert H. Wylie, San Francisco; W. S. Spicer, Newport Beach; E. J. Amar, Long Beach; K. N. Chantry, Los Angeles; Claire V. Goodwin, Oakland; E. E. Ferrari, Stockton; Homer V. Shaver, Portland; W. F. McGregor, Astoria, Ore.; Ward Webber, The Dalles, Ore.; Frank Pender, Vancouver, Wash.; L. L. Goodrich, Longview, Wash.; W. J. Murphy, Grays Harbor, Wash.; Wendell McCroskey, Olympia, Wash.; George W. Osgood, Tacoma, Wash.; A. B. Terry, Seattle, Wash.; F. G. Tegtmeier, Everett, Wash.; Hayes Evans, Port Angeles, Wash.; F. W. Sergeant, Vancouver, B. C.; K. K. Reid, New Westminster, Canada, and T. C. Brooks, Vancouver, B. C.

Low Temperature Air Conditioning For Perishable Cargoes on Ships*

By JOHN F. KOOISTRA†

FOR MANY YEARS refrigeration equipment has been installed on board ships for various purposes which, with respect to applications, may be classified in three distinct groups or types of systems:

1) Refrigeration for the preservation of ship's stores.
2) Refrigeration in connection with air conditioning for passenger accommodations, crew's quarters, and work spaces.
3) Refrigeration, or low temperature air conditioning, for the preservation of perishable cargo.

In all three types of cold producing systems, we find the following five groups of major equipment which are the essential parts of any refrigeration plant:

a. The low side or evaporating side, either coils or air handling units, where the refrigerant is expanded from a liquid to a gas, thereby absorbing heat from the substance to be cooled.
b. The compressor, either positive or non-positive, which draws the low temperature gas from the low side, compresses it to a higher temperature level and discharges this high temperature gas into a condenser.
c. The condenser, or high side, where liquefaction takes place and the absorbed heat in the gas is dissipated to the condensing medium (sea water) and discharged overboard.
d. The liquid receiver where the liquid refrigerant drained from the condenser is stored ready for use again.
e. Miscellaneous accessories such as pumps, motor, interconnecting piping, valves, fittings and controls.

It is impossible to say which is the most important part of the refrigeration plant. Each part is dependent on the other for the proper performance of its function. A good compressor of ample proportions for the work to be done is of little use if the amount of surface in the low side or high side is not also ample and balanced with compressor capacity. Balancing of all parts of the refrigeration system according to load requirement is necessary, and governs the degree of success which may be expected of the system.

Refrigeration for ship's stores no doubt is the oldest application and corresponds in a large degree to a domestic or commercial refrigeration system. Its purpose is to preserve perishable products for consumption by the ship's personnel. Maintenance of temperature is the main requisite for this type of application and consequently only a simple plant is required. Generally two, three or more small, well insulated compartments are provided on each ship for storage of meats, milk, vegetables and other miscellaneous food products. Temperatures vary from 5°F to 40°F depending on type of product stored.

About sixteen years ago comfort air conditioning got its "sea legs", and like every other job to which it has turned, was easily justified for public spaces on luxury liners and work spaces or control centers on Navy vessels. The Matson white ships, and the *Manhattan* and *Washington* of U. S. Lines, were the first passenger vessels equipped with air conditioning in this country.

It is of interest to mention that the first completely air conditioned ship in the world, the *Koan Maru*, was built for the Imperial Railway Steamship Company of Japan in 1935. The SS *Normandie* and the SS *Nieuw Amsterdam*, which were only partially air conditioned, followed a few years later, but no further large-scale air conditioning installations were made until after World Conflict II. Today a number of new passenger vessels have been completed or are under construction for the Mississippi Shipping Co., Grace Line, American President Lines and Matson Navigation Co., which are completely air conditioned, including all passenger accommodations, and in some instances crew's quarters.

The title of this paper, "Low Temperature Air Conditioning" instead of "Cargo Refrigeration" was selected because in the opinion of this writer "Low Temperature Air Conditioning" more clearly and specifically describes the function of the cargo refrigtration plant.

Since the development of air conditioning and the progress made in the control of temperature and humidity for comfort of human beings, more thought has been given to the "comfort conditions" of perishable products. In the past, temperature alone was the only consideration for a cargo refrigeration installation. As a matter of fact, throughout the history of refrigeration, little attention has been paid to the matter of humidity control. If goods spoil, it was just too bad and no one did much about it.

Air conditioning definitely has provided us the "know how" for making refrigeration a more exact

*Paper for Presentation at the Northern California Section of the Society of Naval Architects and Marine Engineers, San Francisco.

†See page 64 and 65 for further reference to the author.

science and, therefore, it is not surprising that those engineers with a thorough knowledge of air conditioning are best qualified to solve unusual refrigeration problems.

Prior to World War II, wall and overhead coils were the accepted standard for most reefer applications. The use of forced air circulation by means of coil banks and blowers (called bunkers) was a step in the right direction, but today modern reefer ships are being equipped with large cold diffusers, factory made and tested equipment, which is available in various sizes to meet the requirements of individual compartments to provide temperatures ranging from —10°F to 55°F with humidity and air circulation to meet conditions required by the various commodities handled.

It has been found that product cooling of the best type is a true air conditioning problem and that all the factors of temperature, air motion and humidity must be carefully considered as having a marked effect on the well-being of the perishable product. Exhaustive study has determined that there is an inter-relation between air conditions and the deterioration of such goods. Appreciable departure from the optimum conditions for a comparatively short time can give serious results.

Putrefaction, fermentation and decay in general are due to the growth of micro-organisms, either present normally in the produce or acquired by contact with air or adjacent products. Enzymes (organic substances capable of producing physical and chemical changes), bacteria, yeast, mould and protozoa all tend to cause deterioration of stored goods.

Temperature. Bacterial growth and chemical decomposition are retarded in activity by lowering the temperature of a perishable product. Too low a temperature will freeze the goods and results in complete spoilage. Consequently, some holding temperature above the freezing point of the article has been set as being the best for storage conditions. In the ripening of fruits, enzymic action is encouraged by an elevated temperature; but upon finishing the ripening period, the temperature is lowered to inhibit further bacterial activity and hold the produce in good condition.

Humidity. Under ideal conditions, a definite amount of moisture enters the air from exposed product surfaces by diffusion from within the goods. Excessively high humidity in a storage room prevents this moisture from entering the air and causes it to collect on the product. This surplus water affords a breeding place for organisms and in spite of low room temperatures, meats and vegetables become slimy and mould propagates rapidly. Low humidity will rob the product of moisture, causing losses in value through impaired appearance and loss in weight. Leafy vegetables wilt, fresh fruits shrivel, and cut meat surfaces darken and often turn black. In the case of meat which is sold by weight, excessive shrinkage and loss in weight cannot be tolerated.

Air Circulation. Air motion is of utmost importance in maintaining uniform conditions throughout the storage space. Stagnant air allows the humidity to build up and leads to mould growth, dripping ceilings and wet floors. High air velocities over the product tend to rob it of moisture and leads to shrinkage and drying. Therefore, it is often necessary to effect a compromise in humidity. However, it is well to keep in mind that a high shrinkage caused by excessive air motion can be decreased by raising the humidity.

Air motion in the case of package products in moistureproof containers is only necessary to produce uniform conditions throughout the storage space. High air motion is desired where all types of products, exposed or otherwise, are being chilled.

Air Purity. Where the product is being held for a relatively long period, air purity reduces spoilage by retarding the transfer or propagation of bacteria and mould spores.

The problem of refrigeration or low temperature air conditioning for shore installations is a complex one; but for cargo spaces on board ship, where a variety of products must be carried in one compartment, the difficulties encountered are even greater. This can easily be visualized from the following table showing storage conditions of perishable products. This table shows clearly that haphazard planning for the ship's cargo refrigeration is dangerous. Only experienced refrigeration engineers should be consulted and experienced operating personnel must be employed to assure proper handling of the various commodities.

FIGURE 1

Storage Conditions of Perishable Products

Product	Permissible Temperature Range, Deg. F.	Permissible Percent Humidity Range
Apples	30-32	85-88
Bananas	56-60	85-90
Berries	31-32	80-85
Citrus Fruits	32-34	85-90
Pears	29-31	85-90
Avocados	31-32	80-85
Potatoes (eating)	50-70	85-90
Mixed Vegetables	35-40	85-90
Celery	31-32	90-95
Candy	60-75	50-55
Eggs (frozen)	(minus) -5- 0	-
Eggs (crated)	30-31	85-87
Beer	35-40	80-85
Butter	35-40	75-80
Fresh Meat	34-38	85-90
Frozen Meat & Poultry (minus)	-5- 0	80-85

The above table presents only a portion of a large number of products which are normally carried in the cargo holds of a sea-going vessel. Complete tables listing every item of produce, meats and miscellaneous edibles, including also information on air motion, etc., are available to anyone interested. It is this writter's opinion that such tables should be supplied to the engineering personnel on a refrigerated cargo ship. As a matter of fact, this information is so valuable that charts of this type should be framed behind glass and mounted near the log desk on the reefer machinery flat.

Proper design of the reefer plant alone is not a guarantee for a claim-free voyage. It is of vital importance

that reefer personnel be fully instructed as to conditions required for the various products carried. Education of reefer personnel through either the ship operators or a union-organized educational program would indeed be a good investment. This may be wishful thinking, but the thought is worth while for further consideration.

As indicated in the foregoing refrigeration for perishable products is basically an air conditioning problem. Duration of the permissible storage period and the quality of the product during storage are directly related to the following:

a. Dry bulb temperature and its uniformity.

b. Relative humidity.

c. Air motion.

In selecting the storage conditions for various types of products the following general rules apply:

a. *Canned and packaged goods:*

A sufficiently low and uniform temperature is the major consideration. Relative humidity and air motion are not important as far as direct effect on the product is concerned. It is important, however, that good air circulation be provided to provide uniform temperature throughout the storage space.

b. *Fruits:*

All fruits after harvesting continue the respiration process, the end products of which are CO_2 and water. This release of moisture through the skin continues in storage. Since respiration rate is a function of temperature and moisture loss rate and a function of the difference in vapor pressure, theoretically the best temperature and humidity would be a dry bulb just above the freezing point and a relative humidity of 100 per cent. For practical purposes, some compromise condition must be chosen. Therefore, it is generally recommended to select a dry bulb temperature 3 to 4 degrees above the freezing point of the fruit. A compromise figure for humidity is necessary because 100% relative humidity would tend to increase mould formation, both on fruit and container. Generally 10 to 15% lower humidity is indicated as giving besr results. It is interesting to note that with forced air circulation a higher humidity may be permitted without increasing likelihood of mould growth while still limiting the rate of moisture loss. This is true because stagnant films of high humidity air on the product surfaces are wiped away.

c. *Vegetables:*

Recommended conditions are similar to those for fruits. Respiration and moisture loss rates are again of considerable importance in determining the conditions. Equal consideration must be given to relative humidity and air motion.

d. *Fresh killed meat:*

Only the most careful attention to temperature, relative humidity and air motion can result in keeping fresh meat in prime condition during storage. The temperature must be sufficiently low to limit bacterial growth. Relative humidity must be controlled within very narrow limits because high humidity will cause slime formation on the meat surfaces, and low humidity will cause too rapid drying, discoloration, and loss of weight.

TYPICAL SHIPS CHILL CARGO
OCTOBER 1947 SAILING
ALL CHILL CARGO LISTED AT [illegible] 36°F

FIG 6A

TYPE PRODUCT	RECOMMENDED SHORT STORAGE CONDITIONS					
	35-47° GROUP		40-45° GROUP		51-60° GROUP	
	DB	RH	DB	RH	DB	RH
GRAPES	35	85				
CELERY	35	90				
CABBAGE	35	95				
PARSNIPS	35	95				
LETTUCE	35	90				
CANNED HAM	34					
PEARS	35	90				
CAULIFLOWER	35	90				
APPLES	35	87				
PEAS	35	90				
CARROTS			40	90		
CHESTNUTS			40	70		
MELONS			45	85		
CHEESE			40	80		
SMOKED MEAT			40	85		
DRUGS			43	70		
STRING BEANS			40	90		
ARTICHOKES			40	90		
BROCCOLI			40	90		
ORANGES & GRAPEFRUIT			40	85		
LEMONS					55	85
POTATOES					50	85
TOMATOES					55	85
CHOCOLATES					60	55
ONIONS					50	75
CUCUMBERS					50	85

e. *Frozen commodity:*

Storage of frozen foods has been by means of fairly well standardized conditions ranging from 0°F. to 10°F. The trend lately has been towards maintaining lower and lower temperatures in the cargo compartments with some vessels being in a position to maintain minus 10°F. High relative humidities are desirable,—in the neighborhood of 85%.

f. *Arrangement of goods in storage:*

The arrangement or stacking of the product in cargo spaces must be such as to permit free circulation of the cooled air throughout the storage room. Undercargo gratings must be constructed and placed in such manner to permit circulation of air under the cargo and battens must be provided to create an envelope of conditioned air around the entire load. Care should be exercised that air distribution is uniform around and through the cargo. Proper placing of dunnage strips between the product is of vital importance to produce uniform conditions throughour.

Assuming that storage conditions have been carefully established, the cargo has been properly stowed and the reefer equipment is performing satisfactorily, what variable factor remains that may affect the turnout of the vessel? The answer, of course, is: maintenance of the proper air temperature supplied to the cargo spaces.

Most reefer engineers devote their time to keeping equipment in operating condition, and log temperatures without giving much thought to the proper "supply air temperature" required to maintain storage conditions. This is no surprise, because the term "supply air temperature" is seldom used in refrigeration. In air conditioning, however, supply air temperature is all important. For shore installations we can predetermine and maintain this temperature, but unfortunately for a ship's cargo installation supply air temperature cannot be maintained constant. This is all the more reason why reefer personnel should be educated in the fundamentals of air conditioning.

Supply air temperature must be regulated carefully. During pull down, the differential between compart-

(Please turn to page 94)

The Designer Had a Reason for It*

(Continued from July issue)

By ROY A. HUNDLEY, Chief Engineer,

Enterprise Engine & Foundry Company

The Cylinder Liner

The main function of the cylinder liner is to guide the reciprocating piston. Most large engines have removable liners in order to more adequately maintain this part which is subject to wear. The greatest problem presented by the cylinder liner is one of a metallurgical nature wherein a good sound wearing cast iron must be produced, and also one of machining, wherein the liner must be round, straight, true and of specific quality of surface finish.

The Valves

The most important part of the breathing of an engine is the valves. Many engines are limited in performance and maximum output by having valves which are too small. Some engines have intake valves larger than exhaust valves, because the pressure exerted to force the air into the ports is less on the intake stroke than that which is available to force the exhaust through the exhaust ports. Many engines are equipped with two valves for each of the two functions— intake and exhaust. It becomes necessary for the designer to strike the economical balance between the requirements of the engine in its breathing as against the economy of manufacturing. Two similar valves reduce the manufacturing burden. Four valves provide for greater breathing area, yet add to the complexity of manufacture, operation, and maintenance. As valves become larger, in order to obtain maximum benefit from these larger valves, the valve lift must be greater. With greater lift and heavier valves, the problem of valve gear train loading becomes a serious consideration. The general approach today is such that the valves are as large as structurally possible to get into the cylinder head. The decision as to two valves per function, rather than one, rests with the speed and operation requirements as against economy and manufacturing. The valve springs, always necessary in the over-all design problem, is one strictly of a mathematical nature wherein adequate spring loading is obtained without causing excessive cam loadings and elimination of the possibility of valve springs vibrations.

The Cams

The design of cams to operate these valves is one in which mathematics predominates. The type of engine, whether large or small, generally dictates the type of cam follower, and from this basic decision, the mathematics of the planned path of the valves is set down. Quietness of valve operation is essential and, therefore, requires careful calculation to obtain uniform acceleration and uniform motion with due consideration to the elasticity of the several parts between the cam and the valve. The material used for cams must be carefully selected in order to obtain satisfactory hardness of surface and strength of core for long life and maintenance of the accurate profile determined by the designers.

The Manifolds

The intake and exhaust manifolds are generally selected and so located on the engine as to provide for smoothness of appearance, and yet provide adequate diameters in order that the gas velocities will not be too high. They are to be of sufficient smoothness in the gas passages to reduce flow losses to a minimum. Exhaust manifolds are generally water jacketed in order to reduce the amount of heat rejected to the immediate vicinity of the engine.

We now come to the fourth major part of the engine, namely that of auxiliaries which, in many instances, is the source of the greatest amount of clever design work to make the application of these auxiliaries adequate, flexible and trouble-free. The designer can not lose sight, for a moment, of the problem presented to him, and he must also attempt to forecast possible additional applications that, as is well known, are brought up by the Sales Department in spite of previous stated limitations.

The Fuel Injection System

The fuel injection system, although classed in this present group, is an extremely vital part of the engine design and in itself can be the limiting condition of speed of operation and maximum loading available with good clean combustion. Similar to the point brought out in bearing design, there are several competent manufacturers of fuel injection equipment and it is the rule rather than the exception that most engine manufacturers purchase their fule injection equipment from those competent manufacturers. Again, similar to the bearing picture, in order for these manufacturers to maintain leadership in their field, they are continually carrying out development and new ideas. Their technical staff is made

*Presented before the Northern California Section of "The Society of Naval Architects and Marine Engineers" in San Francisco June 4, 1948.

available to engine builders to most adequately and effectively design the fuel injection system. One of the major problems before the designer is the determination of the manner of driving the cams to operate the fuel pumps, the location of the fuel pump for convenience of assembly and maintenance, and the location and proper selection of line and nozzle. When these factors have been determined, the final selection of fuel pump, cam, injection line, nozzle, and nozzle tip can be left only to test and an actual accumulation of operating data on the first or pilot model engine. It is necessary that the engine builder have an adequately staffed test department, and adequate facilities to know the characteristics of the fuel system. They must have complete knowledge of the trends and effect of changing the pump and nozzle combination to rectify any abnormal conditions that may be revealed in the original recommendations. It is necessary that a full and complete knowledge of the technique in indicator cards be available, and that the interpretation of the data on these cards as to engine performance, be completely understood.

Although we originally assumed that the engine had been selected as to speed, power output and application, the designer is forever facing the problem, upon successful completion of these problems, that new applications requiring higher output, higher speed, or more severe duty are being proposed by the Sales Department. The designer, therefore, knowing that these conditions will always occur, must not limit his fuel injection system design characteristics to the limit for the present problem. It is not particularly difficult to develop an injection system for a single speed and a single rating in a given engine. However, if it is to be flexible over a wide range of speed and loading, consideration at the time of original design is demanded, whereby the designer may have several alternates to try for the wide variety of loadings and applications.

The Governors

Similar to the flexibility required in fuel injection systems, the problem of suitable governors is one of a similar nature. The speed control of the engine may be handled directly on the fuel pumps using a governor strictly as an overspeed device. For marine service a simple fly ball type governor, without the ability to maintain extremely accurate speed regulation, is generally used. For Generating Plants, more accurate hydraulic type governors are required, and for paralleling alternating current generating sets, still further accuracy with regard to the governors is required. It is therefore necessary that the designer provide on the engine mounting pads and governor drives to handle all of the above mentioned types of governors. While discussing governors, it is also important to realize that this device is a protection as well as a speed control. Frequently a duplicate, separately driven governor is required for protection against overspeed should the main governor become inoperative. When considering protective devices, it is necessary to mastermind and realize the several causes for overspeed and the several protective devices inherently incorporated in several applications. In a direct driven marine application, one of the most effective overspeed protections is the propeller. This assumes, of course, that there is freedom for free running that will permit the operators to rectify the trouble before any traffic difficulties are encountered. It is the burden of the designer to provide protective devices that are sufficiently reliable in operation, in order that he may sleep nights when his engines are operating. This calls for conservative design in the driving mechanism, positive action at the time of overspeed, and positive shut-off in event the overspeed device is called upon to operate.

Lubrication

All moving machinery must be lubricated. In a diesel engine the application of the lubricating oil system is not to lubricate all relatively moving parts but to perform the additional duties of cooling. Heat must be extracted from these relatively moving parts. There is also frequently incorporated a provision for lube oil cooling of pistons. The major portion of the mechanical inefficiency, which is generally approximately 10% to 15% of the power output, manifests itself in the form of heat, the major portion of which is extracted by the lube oil. Experience has shown that for engines without oil cooled pistons, the reasonable figure is one gallon per minute for each 20 horsepower. For oil cooled piston equipped engines, the approximate figure is one gallon per minute per 12 horsepower. These are extremely general figures and frequently the characteristics of the engine will alter them to a certain extent. The effect of lube oil failure is well known to all who have been connected with machinery of this sort. It behooves the designers, therefore, to plan considerably for the type of pump used, the adequacy of the drive, and the over-all safety factor in capacity and rating of the pump and its drive. The final selection of suitable lube oil pumps frequently rests with the experimental data accumulated on the original tests of the pilot model. Here again the designer must not work himself into a corner so that he has no provisions for flexibility of modified applications that may be required.

Water System

Another important parasite on most engines, with the possible exception of the very largest ones, is the water pump and water cooling system. The heat rejected to the water jacket system of any engine is relatively uniform on a horsepower basis. This figure varies from 40 to 50 BTU's per minute per horsepower. With this knowledge and with the established maximum temperature rise that is desired, the flow rate for a given horsepower is then available. Most engines of the class which we are discussing are designed with sufficient water flow to cause a maximum temperature rise between the incoming and outgoing water of between 15° and 20°. Three tenths of a gallon per minute per horsepower is a reasonable figure for water flow rate. One of the first problems facing the designer is whether these pumps should be driven by the engine or by separate motor driven pumps. Frequently the desires of the operator or potential customer governs. Because many operators require engine driven water pumps, provisions must therefore be made in the original design of the engine to drive suitable water pumps for the cooling system. Unfortunately the designer has little knowledge and little control over the piping

system in the vessel or plants at which the engine may be installed. Because centrifugal pumps are most desirable, based on simplicity and trouble-free operation, he must again provide for great flexibility in a potential number of drive combinations and pumps to cover all of the present and future contemplated applications of the engine. It is well known that the flow rate of a centrifugal pump is greatly affected by the total friction and head loss in the over-all cooling system built into the vessel or plant. Another important factor is the height of the overboard discharge which may vary by wide amounts in many types of vessels. Cooperation with the customer on his design and installation is extremely vital in providing adequate cooling facilities for the engine.

In the case of both the lube oil pump and the water pumps, the location on the engine itself is a major design consideration in order that these pumps may be accessible for service and maintenance for any and all contemplated applications.

At least one more pump is necessary, and that is the fuel oil transfer pump to provide adequate fuel to the engine for all operating conditions. This pump is generally small, requiring in the vicinity of one gallon per minute per thousand horsepower, but again must be so designed and applied to the engine to maintain flexibility for wide speed range and horsepower requirements.

Starting

We have now discussed about all of the major parts required on the engine and we have before us now the problem of how the engine should be started. Most small engines are electrically started, similar to automobiles. There is an intermediate size engine where either electric or air starting might be used, depending on the customer's desire. Generally, all larger engines are air started. Frequently large direct current generating units can be provided with starting windings in the DC Generator which makes it possible to use the generator as a motor for starting. Positive starting is a fundamental requirement of all diesel engines. Further, positive starting at very low temperatures is necessary. It behooves the designer, therefore, to provide adequate valve size for starting the engines, as well as adequate pipe sizes for minimum flow restriction in getting the air to the working cylinders. Generally, the air starting valve is provided in the cylinder head and should be approximately 1/10 the diameter of the working piston. With the cylinder head already full of injection nozzles, intake valves, exhaust valves and relief valves, all of which perform a major and important part in the engine during its operation, the starting air valve is frequently forced to be tucked in some corner and is given the least consideration in the over-all cylinder head design. In spite of the lack of consideration, it must be positive and as free as possible from any influences that may cause it to gum up and stick during normal operation of the engine.

Controls

The controls for starting and operating the engine constitute an interesting phase of engine designing. These devices often give vent to the gadgeteering instincts of many designers. The controls must be conveniently located, they must be easy to operate, they must be simple, and they must be attractive. It is noted that most photographs of engines are so taken as to show the controls, and efforts are made to give the impression that great consideration has been given to the convenience and attractiveness of these controls. The designer, in developing controls to most efficiently fit them to the engine, must not lose sight of the number 1 requirement, which is that they must perform their function, and must consider all other requirements as enumerated above, and yet so locate them that they will be of convenient height for contemplated applications.

We shall assume now that we have completely designed an engine. A pilot model is built and tests are made. It is well known that there is an equal amount of design work necessary after the engine has been built as there was in the original conception. It is not always possible to determine from the drafting board the most suitable manner in which parts can be manufactured. Good potent ideas are seldom possible without having a part to make or several parts to assemble before these good ideas can be brought forth. The ultimate high degree of perfection of design is achieved when the designer, the shop production personnel, the field servicemen, the Sales Engineers, and, not the least important, several good customer representatives, all get together and present their many ideas as to how the many things and parts should be most efficiently designed to achieve the ultimate end of a satisfactory piece of equipment for the application intended.

To summarize the several phases of engineering knowledge for which the designer in his engine design development program is called upon, it is apparent that mathematics in its many phases was used. Practically all of the phases of the fundamentals of machine design are utilized in developing the diesel engine. You have mechanisms, motion, acceleration, deceleration, velocity, gears, cams and lubrication, to mention the most important. The designer is called upon to have good knowledge of stress analysis and, because practically all of the engine is a product of metals, a good complete knowledge of metallurgy is necessary in order that the proper selection of materials can be achieved and the proper treatment of these materials is accomplished. He is called upon to have a good working knowledge of foundry and pattern problems. Further, it is necessary for him to have at his disposal a knowledge of fluid flow of both liquids and gases and problems akin thereto. And not the least important, he must have a good knowledge of human relations. He must work not only with his own men, who, as subordinates, can presumably be well handled, but also with Department heads and all Departments who collaborate on the ultimate production of the diesel engine.

It is believed important, at this stage, to point out what are considered to be essential qualities in the designer. First, he need not be an expert in all the fields mentioned above, for it is not to his belittlement to call in experts for consultation. His recognition of his shortcomings is to his credit rather than discredit in an effort to accomplish the best in the ultimate product. Second, the engineering designer must not lose the commercial aspect of the product he is designing. If the product is

(Please turn to page 100)

Pacific WORLD TRADE
Reg. U. S. Pat. Off.

Doing Business Under the Foreign Assistance Act

By A. M. STRONG, Vice-President,
American National Bank and Trust Company of Chicago

Editor's Note:

Exporting under the Marshall Plan is going to be of such importance, in comparison with normal exporting, that every one in the industry should be kept informed of the details. The Department of Commerce, the World Trade departments of Chambers of Commerce, and your own bank will explain fully.

Mr. Strong has come up with some real assistance in the following outline. We will publish further detail from time to time.

A. M. Strong

THE FOREIGN Assistance Act (Marshall Plan), signed by the President on April 3, 1948, is now in operation. The Act is administered by the Economic Cooperation Administration, with Mr. Paul G. Hoffman as Administrator. Shipments are already being made under the Act, and purchases are being arranged. Because we believe it is in the interest of our customers to be acquainted with the procedure of doing business under the program, we are pleased to outline below its practical aspects.

Proposed Commodity Shipments

The following tabulation represents an estimate of the needs of the participating countries between April 1, 1948 and March 31, 1949. It should, however, not be considered a fixed program:

COMMODITY	*Millions of Dollars*	COMMODITY	*Millions of Dollars*
Bread Grains / Coarse Grains	957.2	Sugar	117.9
		Meat	83.6
Fats and Oils	131.9	Dairy Products	133.5

Oilcake and Meal	60.2	Eggs	12.0
Dried Fruits	6.7	Timber Equipment	13.1
Rice	34.6	Electrical Equipment	43.3
Coffee	26.1	Copper	85.6
Other Foods	20.0	Lead	53.5
Tobacco	110.2	Zinc	37.4
Cotton	511.3	Aluminum	14.5
Nitrogen Fertilizer	20.6	Wool	24.6
Phosphates	1.0	Cotton Yarn	2.7
Agricultural Machinery	81.5	Cotton Cloth	72.6
Coal	245.3	Newsprint	23.3
Coal Mining Machinery	49.1	Rubber	2.1

Petroleum Products	379.7	Hides, Skins and Leather	89.1
Timber	142.2	Fish	47.1
Finished Steel	75.5	Chemicals	166.5
Crude and Semi-Finished Steel	20.2	Machinery, N.E.S.	329.4
Pig Iron	.3	Vehicles, N.E.S.	88.6
Trucks	48.1	Petroleum Equipment	67.4
Freight Cars	53.0	Miscellaneous Commodities	239.6
Steel Equipment	28.3		

Selling Under The Program

According to a joint statement by the Economic Cooperation Administration and the Department of Commerce, the bulk of transactions will be conducted through private channels. In other words, the ECA will not act as a procurement agency; however, government agencies will continue to buy certain bulk food products, such as grains, rice, fats and oils, and a small quantity of relief supplies. In all other fields, American exporters and European importers will continue to do business in the same way as in the past.

Solicitation of orders and sales arrangements should be made by American manufacturers and exporters as heretofore, through established agents and distributors in Europe. Shipments to Europe require a license of the Office of International Trade and such licenses must be obtained in the same manner as they are obtained now.

In order to obtain dollars for payment, the European importer must apply to a special agency in his country for approval of his purchases. When the request is for a product included in the schedule approved by the Economic Cooperation Administration, he will obtain permission to import and to pay for his goods with dollars set aside for ECA purchases.

Foreign governments have been requested to curtail the operation of their purchasing missions in this country. Nevertheless, some missions will continue to handle purchases. Manufacturers and exporters in this country desiring to sell to Western Europe must therefore operate through their representatives overseas and in some cases contact our government agencies and foreign government purchasing missions.

Payment to American Shippers

The Economic Cooperation Administration on May 15 issued Regulation Number 1 outlining the procedure involved in making payments for purchases under the program. Procurement authorizations will provide the following methods of payment:

(1) *Reimbursement to a participating country for payments made by it.*

(2) *Issuance of letters of commitment to banking institutions in the United States under which the bank will issue a commercial letter of credit to the supplier.*

(3) *Issuance of letters of commitment to the American suppliers of the goods.*

Under the first method, the participating company will provide its own dollars for purchases in the United States and later obtain reimbursement from the Administrator. This method will be used during the transitional period or for payments made by the participating countries prior to April 3, 1948.

Under the second method, the foreign buyer requests his bank to establish a letter of credit in favor of the American supplier. The foreign bank will designate an American bank and the Administrator will forward to this bank a letter of commitment undertaking to reimburse the bank for payments made to American shippers. The American bank will establish a letter of credit which will require the usual shipping documents and in addition a certificate from the shipper reading as follows:

Beneficiary's Certificate

Description of Contracts:
Name of Parties...
Date.............................
Commodities or services
covered: ....
(Brief description)
Seller's Contract No. (if any)...............................
The undersigned, in negotiating or presenting for payment (acceptance) draft No.............................. dated............................ in the amount of $.............................. drawn by the undersigned under Letter of Credit of.............................. Bank, No.............................. hereby certifies to and agrees with the Administrator for Economic Cooperation under the Foreign Assistance Act of 1948 as follows:

1. The undersigned has been informed that payment of said draft has been or is to be made by said Bank in reliance upon a Letter of Commitment issued by the Administrator, in accordance with the said Act, and that reimbursement of the amount of said draft to said Bank will be made by assignment of funds of the Administrator made available to the party for whose account said Letter of Credit was issued.

2. The undersigned is entitled to payment in the face amount of the aforesaid draft under the contract specified on the face thereof and hereof, and the undersigned will promptly make appropriate reimbursement to the Administrator in the event of the non-performance by the undersigned in whole or in part under said contract.

3. The undersigned is the manufacturer or producer of, or a regular dealer in or exporter of, the commodity or service covered by said contract under any agreement for a commission, percentage or contingent fee except to the extent, if any, of the payment of a commission, fee, or discount, to a bonafide established commercial or selling agency employed by the undersigned for the purpose of securing business, whose identity has been disclosed to the purchaser and whose terms of employment will, upon demand, be disclosed to the Administrator for Economic Cooperation.

4. The undersigned has not given or received, and will not give or receive by way of side payments, "kickbacks," or otherwise, any benefit in connection with such contract, except in accordance with the terms thereof.

5. The contract price under said contract does not exceed the established or market price, whichever is lower, for the commodities current at the time the contract became binding or in the event of an "escalator clause," then at the time of delivery, and does not exceed the prices paid to the undersigned for similar amounts of like commodities by other customers, and the undersigned has allowed all discounts for quantity purchases and prompt payment customarily allowed the other customers of the undersigned similarly situationed.

6. Payment under said contract is not based on cost-plus-a-

Pacific World Trade

percentage-of-cost.

Executed at ..
(City) State
this. ... day of . 19
(Vendor or Supplier)

The American shipper will also be required to furnish a similar certificate for a payment without a letter of credit. It should be noted that the Administrator reserves the right to modify or revoke the procurement authorization. However, the revocation will in no event affect any obligation incurred by a bank under an irrevocable letter of credit issued prior to receipt of such notice.

Under the third method, the letter of commitment will be issued to the American shipper and the Administrator will agree to pay the shipper for goods delivered to a participating country. A letter of commitment to a supplier will be issued only in connection with a specific contract and will be sent to the supplier directly by the Administrator or by the foreign buyer through normal trade and banking channels. Monies due under a letter of commitment to a supplier are assignable to banking institutions. The letter of commitment to suppliers will be issued in two forms; for single payments and multiple payments.

Form of Single-Payment Letter of Commitment by the Administrator

Non-Negotiable

Letter No.. ....
(City) (State or Country)
Procurement Authorization No.... ... .
.... , 19 ..
(Month) (Day)
U. S. $..... ....

Letter of Commitment, Single-Payment Transaction

The Administrator for Economic Cooperation, acting for the United States of America, hereby agrees to pay , not more than the sum of................... in United States dollars, as per attached copy of contract between ... and ...., dated.................................. ..1948, referring to.......... ...., and upon presentation of this Letter to him at. .. .., and the submission of the following documents:

Certified invoice; Inspection report; Full set of order bills of lading................ ....

Requested by: Issued by:

....
(Signature)

Authorized Agent of the
Government of ... .
(Title)

The right to receive monies due or to become due hereunder may be assigned only on the reverse side hereof and only to a banking institution organized under the laws of the United States, any State, territory or possession thereof, or the District of Columbia.

No payment will be made hereunder if attachments are missing or fail to correspond hereto.

The beneficiary's statement on the reverse side is similar to the beneficiary's certificate under a letter of credit.

To Sum It Up

To do business under the Marshall Plan, exporters should continue to use their present distributors and agents; however, for certain commodities such as grains and other foodstuffs, or drugs purchased for relief purposes it will be necessary to deal with U. S. Government agencies. Certain purchases will be made by foreign government purchasing missions.

Brazil Seen as Coming World Leader in Natural Silk

Brazil's silk industry is being revived and mechanized and within the next few years will be able to compete on the world market not only against Japanese silk but against artificial fibers, according to a report from São Paulo to the Brazilian Government Trade Bureau, New York.

A Brazilian branch of the Mechanical Raw Silk Corporation, formed in Switzerland with Italian capital, has already begun loaning out machinery to Brazilian silk growers. Saving in labor as a result of the machines is estimated at more than 90 per cent.

Three Main Machines

The machines, as described, are a "leafer", which strips leaves from mulberry trees for worm fodder; a "feeder," which sorts the silk-worm trays, distributes leaf fodder on schedule and removes refuse; and a "threader" which unwinds silk cocoons.

The machines operate with low-power electric motors and will be rented out at low cost, according to the president of the company, Antonio Pacetti, who has been in Brazil for the past year.

Experts of the company have estimated that with some 2,000 machines, Brazil could produce around 140 million kilos of silk cocoons a year, compared with Japan's present output of about 80 million kilos.

Brazil Seen as First

Brazil would become the first country in the world with a wholly mechanized silk industry if these plans are carried out, it was said. Mechanization has made little headway in Japan, although the theoretical advantages of machines have been known to silk growers all over the world for many years.

Brazil's silk industry, on a manual labor basis, was greatly revived during the war when the Western World was cut off from Japan. It collapsed again after the war, however, when large quantities of Japanese silk were made available through U. S. authorities.

Would Cut Costs

Silk production costs, reckoned now at around 50 cents (U.S.) a kilo, would be cut to around 15 cents a kilo by the new machinery, it was estimated. Costs at that level would place silk on the market at prices comparable to those charged now for nylon.

Brazil has long been considered by experts as possessing the best natural conditions in the world for silk growing. The quality of Brazilian silk is admittedly as good or better than any competitor. Brazilian mulberries, moreover, grow at a much faster rate than in Italy or Japan, with the appetite of the silk worm keeping pace. Less time is needed to produce the same amount of cocoons.

Carl McDowell

Carl McDowell Appointed by Stanford

When Eliot G. Mears was its professor of foreign trade and Pacific Ocean shipping, Stanford University achieved a place of leadership in these subjects in the academic world. When Dr. Mears died a year or so ago Stanford felt his loss keenly and has been on the lookout for an able successor.

So it will be good news to Pacific Coast world trade interests and to Stanford people that Carl E. McDowell has been appointed to succeed Dr. Mears.

McDowell graduated from Stanford University and the Stanford Graduate School of Business. While still in school he worked his way around the world twice on Dollar Line vessels and also assisted in a special study by the Department of Commerce on trade between the Pacific Coast and South America.

Directly after leaving the University he joined McCormick Steamship Company's Traffic Department and for two years made special studies of the trade routes of the company, traveling on their ships and visiting all the territories which they served. As assistant to McCormick's executive vice president, Charles L. Wheeler, to which post he was appointed in 1935, McDowell handled affairs of both the Steamship and Lumber Divisions.

In the Navy during the War, McDowell served in the Port Director Service in the Pacific area, Port Hueneme, and Washington, D. C., and also assisted the War Shipping Administration in establishing its division of cargo requirements. He was in civil service during the last several months of the War, serving as deputy to the assistant to Admiral Land, administrator of the WSA.

McDowell returned to his position as assistant to Wheeler in 1946 and since that time has also been lecturing at the Graduate School of Business at Stanford. He has been active in maritime industry affairs and is at present serving as assistant secretary-treasurer of the Propeller Club.

S. F. Junior World Trade Election

Election of new officers and members of the Board of Directors of the Junior World Trade Association of the San Francisco Chamber of Commerce is announced by Herbert G. Porter, outgoing president.

Officers elected are: President, George W. Schmitz, Wells Fargo Bank and Union Trust Co.; vice president, Jack M. Weese, Funch Edye & Company; secretary, Bruce A. McClelland, Frazar and Hansen, Ltd.; treasurer, John J. Buckley, American President Lines.

New Board of Directors of Junior World Trade Association.

Board members in addition to the officers are: Edward A. Myers, Jr., Otis, McAllister & Company; Reno J. Franceschi, Getz Brothers and Company; Charles M. Freeman, Tidewater Associated Oil Company; Francis Novitzky, American President Lines; and Joseph A. Wagstaff, S & W Fine Foods.

New officers and board members will serve for the 1948-49 term.

Pacific World Trade

Philippine Trade Mission

By ALVIN C. EICHHOLZ, Manager,

World Trade Department San Francisco Chamber of Commerce

Alvin C. Eichholz, Manager, World Trade Department, San Francisco Chamber of Commerce and Pedro J. Ocampo, Secretary, Chamber of Commerce of the Philippines, discussing plans for a close cooperation between the two chambers of commerce on future Philippine-American business.

In a trade-surveying trip made under the auspices of the San Francisco Chamber of Commerce to the Philippines, headed by Chamber President W. P. Fuller Brawner, results were attained that proved the great value of closer contacts between American business firms and similar firms in the Islands. In the Philippines there is the added importance of cooperation with government officials and political leaders. Business in the Philippine Republic is in a formative stage but its leaders are so enthusiastic about their work and the prospects for their country that it is hard to keep up with them. In many ways it is necessary to explain the business processes in America in order to justify what seems to them to be unnecessary delay in providing the help they obviously need.

There were many accomplishments as a result of the conferences in Manila, almost any one of which would have justified the trip.

Preliminary arrangements were concluded between San Francisco and Philippine Chambers of Commerce for servicing each other's members through the World Trade departments. San Francisco has been established in the minds of Philippine leaders as the central point of contact for business dealings in the United States, and permanent working committees were set up to exchange reports, discussions of current problems, and for carrying out a program of wider publicity for Philippine accomplishments and developments. Important friendships were made on both sides and a great feeling of mutual confidence and understanding; and a wider knowledge of resources of the Philippines was brought about.

Having in mind that the purpose in going to Manila was the accomplishment of better understanding, it is certain that the trip was a success. There were twenty-two members of the delegation and all were well satisfied with it.

Top: The Pacific Coast-Honolulu Delegation welcomed on arrival at Manila Airport. Left to right: General Robert H. Wylie, Port Manager (San Francisco), Board of State Harbor Commissioners; Alvin C. Eichholz, Manager, World Trade Department, San Francisco Chamber of Commerce; John P. Studebaker, Vice President, Washington Machinery and Storage Co., Seattle; Gil Puyat, President, Philippine Chamber of Commerce, Manila; Herbert A. Sawin, Sales Engineer, Yuba Manufacturing Company, San Francisco; Katherine Brawner, daughter of W. P. Fuller Brawner; Arthur D. Levis, Connell Brothers, Ltd., San Francisco; W. P. Fuller Brawner, President, San Francisco Chamber of Commerce and Vice President and Treasurer, W. P. Fuller & Co., San Francisco; Norman Jermal, Norman Jermal, Inc., Honolulu; Ronald E. Kaehler, President, San Francisco Stock Exchange; M. de la Fuente, Mayor of Manila.

Bottom: Delegation from San Francisco being welcomed at Honolulu by native group. Left to right: W. P. Fuller Brawner, Arthur D. Levis, John P. Studebaker, Katherine Brawner, General Robert H. Wylie, Ronald E. Kaehler, H. A. McConnell, Humphreys & McConnell; Alvin C. Eichholz, Herbert A. Sawin.

Marine Insurance

The London Letter

By Our United Kingdom Correspondent

Marine Insurance Observations

SIR ERNEST H. MURRANT

TO THE LENGTHY LIST of authorities who have given their views on the working of the marine insurance market has to be added the name of Sir Ernest H. Murrant, chairman of the World Auxiliary Insurance Corporation, Limited, London. Sir Ernest is, perhaps, better known as the head of the Furness Lines. After pointing out that, apart from the number of total losses which occurred during 1947, the year was also memorable for the general increase in other types of casualty, he states that this fact has been brought out in some interesting statistics published in the early part of the year, one contributing factor to this increase being the large number of shaft and propeller failures. Many of these casualties, he says, will give rise to heavy claims for salvage, which service, in common with others, "is more expensive today than it was prewar. Most of the shaft failures occurred on vessels which were constructed overseas. The cause of the failure is being closely investigated by experts, and it is hoped that before long a corrective will be found and applied to the type of vessel principally concerned."

Sir Ernest Murrant's further observations on the working of the marine insurance market follow:—

"At the close of hostilities underwriters considerably reduced premiums on hulls, but unfortunately hopes of any substantial decrease in the cost of repairs have not materialised. On the contrary, repair costs continue to reflect approximately the same relative increase over prewar costs as apply to new shipbuilding.

"My remarks have mostly had reference to hull insurance—the cargo side of our business has been so much discussed that there is little to add. The prevailing evil of theft and pilferage remains the headache of cargo underwriters. Great efforts are being made in certain quarters to effect an improvement, but reports coming in from many parts of the world leave little doubt that thieves and organised gangs are still reaping a rich harvest as a result of world-wide shortages and high prices."

SIR EDWARD MOUNTAIN

Sir Edward Mountain, chairman of the Eagle Star Insurance Company, Ltd., London (the Company had resources at the end of 1947 totalling £41,000,000, and received premiums in all departments during 1947 amounting to £11,000,000), writes on the marine insurance position as follows:—

"Hulls.—The Joint Hull Understanding has been maintained with little variation, but it is still too early to judge whether the rating formulae, in operation since the end of the war, are adequate having regard to the continued rise in the costs of labour and materials and the congestion which still prevails in ship-repairing yards all over the world.

"Cargo.—The Combined Marine Surcharge Agreement and similar scales abroad have been continued, with periodical variations, to meet ever changing circumstances, and it is essential for the protection of marine underwriters that these surcharges should be maintained until the conditions under which world trade is conducted have been generally stabilised. There is little, if any, abatement in the number and volume of

losses by theft and pilferage, particularly in relation to high class goods."

H. M. BOOT

From Holland comes news of hull business and similar matters. The informant is Mr. H. M. Boot, who recently delivered his presidential address to the Association of Marine Underwriters in Holland. Concerning hull business, Mr. Boot said that there was no indication of any decrease in the extremely high cost of repairs, and that, while the present record was not unsatisfactory, one day adverse results would have to be faced. After saying that in his opinion rates often quite unnecessarily reduced to bottom level were neither in the interest of the underwriter nor those of the shipowner, he went on to suggest that future increases of rates might come at an inopportune moment, since fleets were increasing on a large scale, and this might affect freights unfavourably, so that increased insurance costs might have to be paid out of decreased freight receipts.

Turning to the future, Mr. Boot referred to the theft and pilferage problem, and expressed disappointment that, after many months of negotiation, the Dutch authorities had decided that the problem was of no importance to them. He added:—"Fortunately, we have been able to co-ordinate shipping and transport circles, and an extensive programme of counter measures is now being worked out which we trust will erase the bad impression the Government's non-activity may have made abroad."

International Conference on Safety of Life at Sea

After a session lasting seven weeks, the International Conference on Safety of Life at Sea, held in London, has come to an end. At the final meeting it was decided that the new Convention should remain open for signing for another month, as the Soviet and Jugoslavian representatives wished to consult their Governments before signing.

Alfred Barnes (Minister of Transport) said that the conclusions of the Conference represented a major advance in the campaign for greater safety of life at sea. The Conference, he added, could never have been brought to a successful conclusion, and would never have reached a Convention which was really worth while, had there not been a determination on the part of all to pool their knowledge, their ideas and their experience, and to co-operate each with every other country to work out a common code acceptable to all.

Sir John Anderson (president of the Conference) said that the Conference had made an important advance by the introducion of new regulations for minimising the danger of outbreak of fire.

Except in the chapter on Safety of Navigation, the Convention will apply, like that of 1929, to ships on international voyages—that is, voyages between a port in a Convention country and a port outside that country. It will come into operation on January 1, 1951, provided the necessary number of acceptances have been received by that date—namely, acceprances by fifteen countries, including not less than seven each with not less than one million gross tons of shipping.

Life Saving Jacket

A new type of life-saving jacket, which was invented during the war by a Norwegian, Finn Tveten, has just been demonstrated in London. It is the Sea-Dog Life-saving Jacket and weighs just over 1 lb. It was demonstrated by Sea-Dog Life-Saving Appliances, Limited, of West Hartlepool, England. Sweden is one of the countries to which the jacket is being exported. Those who witnessed the demonstration included some of the delegates of the International Conference on Safety of Life at Sea. The inventor claims that the life jacket is fifteen times lighter than cork.

Book Reviews

FIRE PROTECTION STANDARDS FOR MOTOR CRAFT, adopted by National Fire Protection Association, Boston.

All owners of motor craft, both pleasure and commercial, will find this booklet invaluable. The detailed recommendations contained in the Standards are designed to provide motor craft owners with the knowledge to prevent any possibility of fire in their craft. Complete directions on proper equipment and care of the boat is included, and various types of fire extinguishers are described.

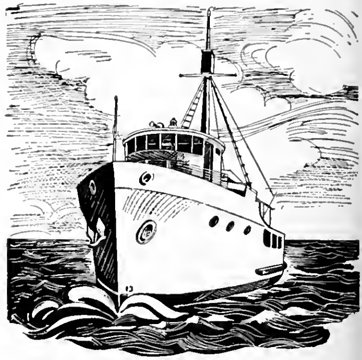
EVERYMAN'S HISTORY OF THE SEA WAR, VOLUME I, by Commander A. C. Hardy, published by Nicholson and Watson, London, England. Price, 18 shillings; 350 pages.

A dramatic story of great sea events from September 1939 to December 1941, this volume covers the period from the sinking of the *Athenia* to the loss of the *Prince of Wales*. The volume has many illustrations and is written in non-technical language. It is instructive as well as entertaining.

The author has had wide experience on the Naval Staff, and as a member of the Royal Corps of Naval Constructors. He has written numerous books on all kinds of shipping subjects, both naval and merchant marine, and has an intimate knowledge of the ships and shipping of Continental Europe, extending back over many years.

Volumes II and III of this book will be issued later.

Coast Commercial Craft



The Pan Pacific

One of the latest vessels to join the Pacific Coast fleet of modern brine-refrigerated seiners is the *Pan Pacific*, completed in April by the Pacific Boatbuilding Company, Tacoma, Wash. Principal owner is Pan Pacific Fisheries, Inc., Terminal Island, Calif. The vessel departed Puget Sound for the south April 11, under the command of Andy Kuljis, skipper and part owner.

The Pan Pacific.

The *Pan Pacific* has a heavily built, sawn frame, wood hull, measuring 103 feet overall, with beam of 37 feet and draft of 13 feet. She is driven at approximately 12 knots by an 8-cyl., 800-hp Enterprise diesel main engine. Two 60-kw General Motors DC generators, driven by 6-cyl., GM diesel auxiliaries, provide power for three 5"x5" Kohlenberger ice machines, as part of a complete brine refrigerating system.

Deck machinery includes a Northern winch, driven by a 40-hp DC electric motor, powered in turn by a third GM diesel auxiliary. All pumps are also electrically driven. The *Pan Pacific* is equipped with Barbour's Gold Medal tuna netting furnished by Pacific Marine Supply Co.

Both navigating equipment and facilities for comfort aboard the *Pan Pacific* are unusually complete. Sperry gyro equipment provides full automatic steering. Radio equipment includes a 450 watt Intervox radiotelephone, Model 7R Intervox direction finder, and an Intervox intercommunication system. Crew's quarters and engine room boast forced ventilation. Galley has a walk-in refrigerator, attractive tile drain board, seating provisions at table for a crew of twelve, and an Intervox galley receiver.

On the Ways

New Construction—Reconditioning—Repairs

Big Spuds

The San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division, has just completed fabrication of two dredge spuds (shown in the picture opposite) for the San Francisco Bridge Company's hydraulic suction dredge S. G. Hindes which are among the largest ever built on the Pacific Coast.

Each of the two spuds, which hold the dredge in position while it is digging, was made from three cylinders of 1¾" silicon structural steel plate, one 28' long and two 22' long. These were formed in halves on the yard's 500-ton hydraulic press and welded together by automatic welding machine. After the cast steel spud point had been welded on, the welds were then X-rayed and each complete spud stress-relieved.

Such a large fabrication job presented several problems which were successfully overcome by Bethlehem engineers. These included the forming of high strength steel of such thickness, and the maintaining of a tolerance of plus or minus ⅛" on the diameter along the full length of the spud so as to insure a close fit in the spud keeper.

Bethlehem Completes Long Dredge Boom

The construction and rigging of one of the longest dredge booms in the country was recently completed at the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division. The boom has an overall length of 242 feet and completely rigged, weighs more than forty tons. It was recently installed on the Olympian Dredge Company's bucket type dredge Neptune, which will soon resume its job of building levees on the Sacramento River.

The boom itself was cut from Douglas Fir and is 24" square. It was put together in four pieces, with three scarphs, each 26 feet long. It is braced by four wooden spreaders, two in the middle 44 feet long, and two on the end 28 feet long. Almost a mile of wire rope, varying in diameter from ⅝" to 1½" was used from the topping lift, bucket, bracing lines, twister ropes and safety line.

In the picture at the left, the new boom has just been raised from horizontal position on pontoons in foreground while wire rope rigging is being installed.

At the right, workmen make final inspection of rigging on the dredge Neptune's new boom.

A Navy LST
—From War to Peace

IN WHAT REPRESENTS the first job of its type to to be performed on the Pacific Coast, the Alameda Yard of Bethlehem Steel Company, Shipbuilding Division, has just converted a Navy LST into a freighter for E. G. Fontes and Company of Rio De Janiero, Brazil. The *Rio Douro*, the vessel's new name, has an overall length of 328', a beam of 50', and a light displacement of 1,412 tons. She is equipped with two 900 HP General Motors diesel engines and three 100 kw General Motors auxiliary generators. Nicholas Gravem & Sons of San Francisco, agents for the new owner, state that the purpose of the vessel will be to carry general cargo from Rio north to Trinidad and south to the River Plate range, Buenos Aires.

When the *Rio Douro* came into Bethlehem's Alameda Yard, she was first drydocked, her hull was cleaned and painted and both tailshafts were drawn for examination. Her stern tubes were cleaned and the shafts replaced. Her bow ramp door was closed by welding a 12" butt strap over all seams and the door reinforced by strongback and breasthooks. The ramp under the forward hatch was removed and the hatch closed by welding insert plates flush to the deck.

One transverse collision bulkhead was installed at Frame 8 with necessary stiffeners so as to conform with Classification Society requirements, thus making the new fore peak tank complete with new installed suction line and new access hatch on main deck.

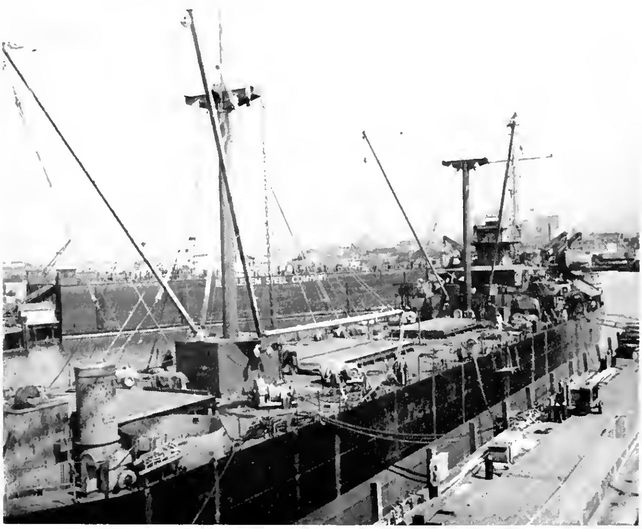
Two new hatches 32'x18' were installed on the main deck with a 24" high combing, and a 2' wide shear strake doubler was installed port and starboard from Frame 12 to Frame 36 to compensate for the new hatch openings. A full transverse bulkhead was installed at Frame 19, separating No. 1 hold from No. 2 and 3 holds.

Two 24" diameter masts, fabricated at the San Francisco Yard of Bethlehem Steel Company, were installed. These were stepped to the third deck and were complete with top masts and yard arms to take boom topping lift blocks. Winch resistor houses were built around the masts on the main deck. In addition, four 5-ton booms were stepped on the resistor house at foremast and two 5-ton booms on the resistor house at main mast. These were fitted with all required rigging.

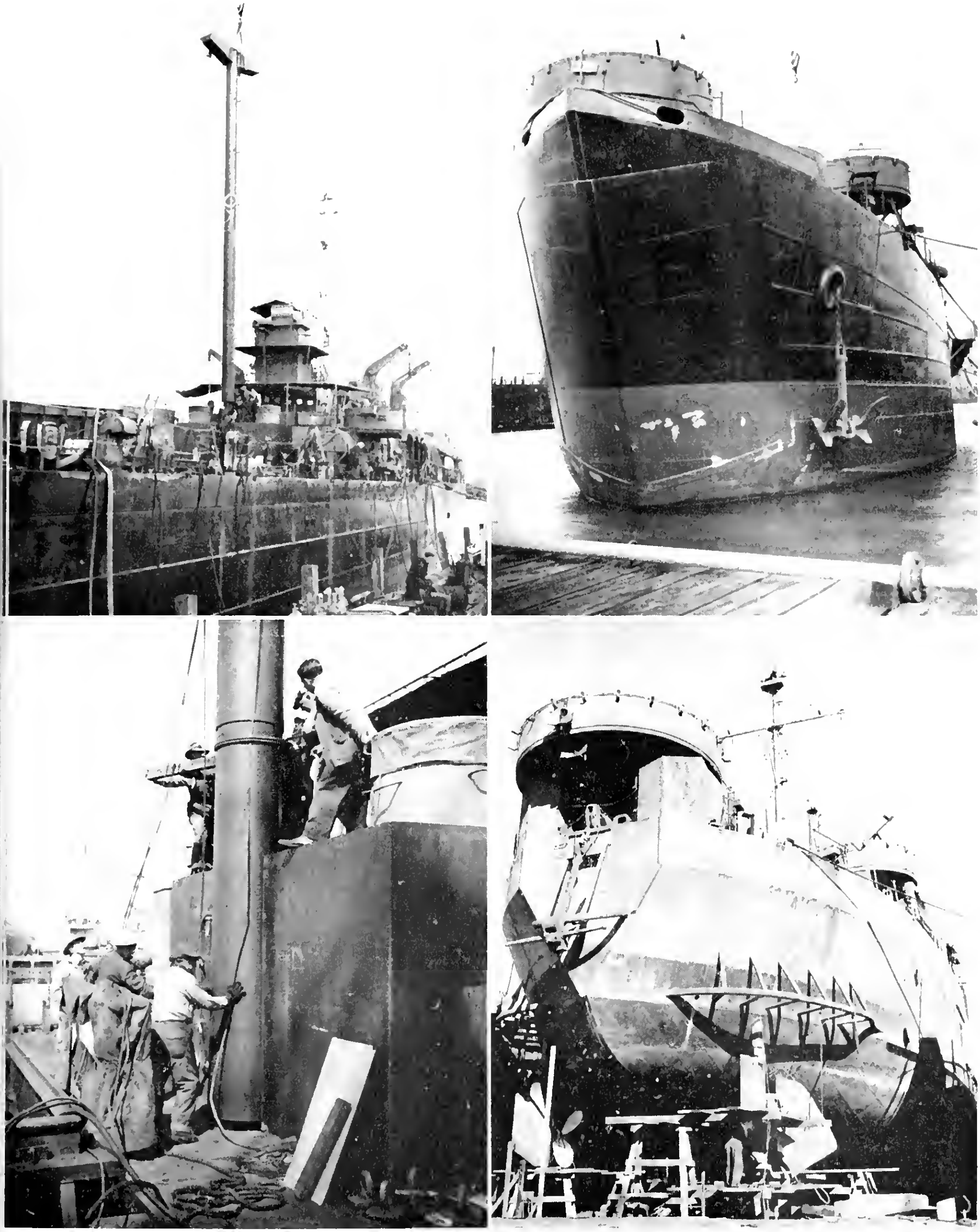
Other work performed by the yard in this unusual conversion included overhauling all machinery in main and auxiliary engine rooms, installation of cargo winches on the main deck, and a new anchor, anchor chain, windlass, chain pipe and chain locker.

When the *Rio Douro* left the Alameda Yard, following completion of her conversion, she bore little resemblance to the dull, gray vessel that landed American fighting men on distant Pacific shores.

Nicholas Gravem, agent for the vessel, who also followed closely her transition from a fighting ship, started business in 1941, with his two sons, Nicholas Gravem, Jr., who went into the Merchant Marine when war started and obtained his masters papers, and Otis Gravem, who entered the Navy from Columbia University with rank of Ensign and he saw sea duty during the war.



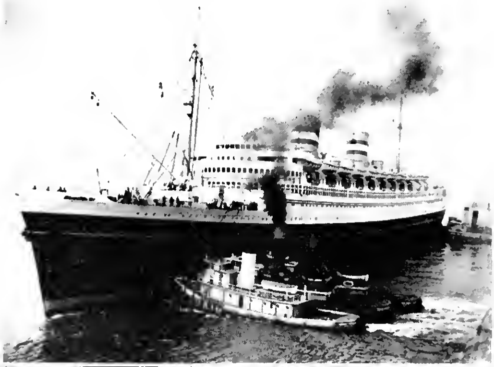
View of deck of RIO DOURO showing new hatches, masts and cargo handling gear.



Left, top and bottom: One of the RIO DOURO'S masts is shown during stepping operation.
Top right: Closeup showing how the vessel's bow ramp door was closed by welding a 12" butt strap over all seams.
Bottom right: Stern view of the RIO DOURO on drydock.

Largest Drydocking at Todd Brooklyn

The NIEUW AMSTERDAM puts into the Todd Brooklyn shipyard, aided by seven tugs, for 48-hour stay.



To speed up the drying of the vast bottom of the NIEUW AMSTERDAM, a Todd-developed Thag machine (shown below) was brought into use.

Another view of the bottom of the NIEUW AMSTERDAM shown at the Todd Brooklyn Graving Dock (below). Shown are the snake-like tentacles of the 200-foot hose.

The largest vessel that can be handled in a privately-owned drydock in New York, the 36,667 gross ton flagship *Nieuw Amsterdam*, was recently put into the Todd Brooklyn shipyard for a 48-hour drydocking, bottom painting, and miscellaneous voyage repairs.

She was accommodated at Todd's No. 1 Graving Dock. 758 feet overall, she is the third largest ship in service coming to the United States.

The berthing of the big Netherlands' ship was aided by seven tugs, and was tied up in the graving dock an hour later. The pumping-out of the 16 million gallons of water in the dock took two hours. Even while the graving dock was emptying, workers on floats were pushing their way around the dock, wirebrushing the exposed area below the deep waterline.

To assist nature in drying the vast bottom, Todd's engineering department employed a unique hot air blowing unit, called THAG, which they developed recently for hull-drying and other procedures calling for a steady application of high-temperature heat. The unit was set up near the stern of the drydock and two hundred feet of the snake-like 20″ tubing was spread along the drydock bed with four 50-foot outlets. By constant application of 250° heated air, the drying of about one-fourth of the hull was speeded.

The painting included a coat of primer brushed on, followed by a coat of anti-corrosive sprayed on from keel to deep load line. A special coat of Super-Tropical, anti-barnacle paint was then brushed on from keel to light load line, and red boot-topping applied to the remaining section between the light and deep load lines.

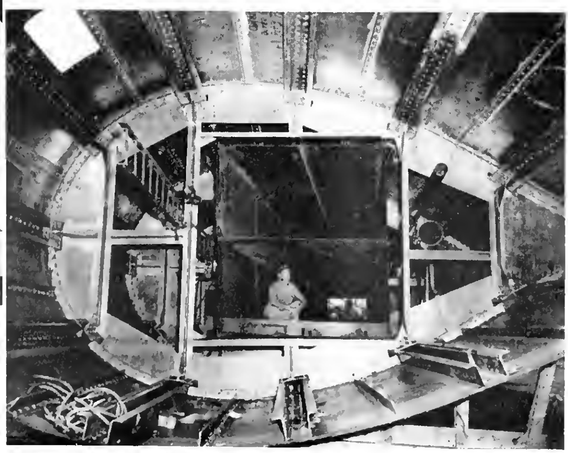
About 850 gallons of paint were applied in a shift in 26 hours working time by as many as fifty painters.

'ashington in Brooklyn

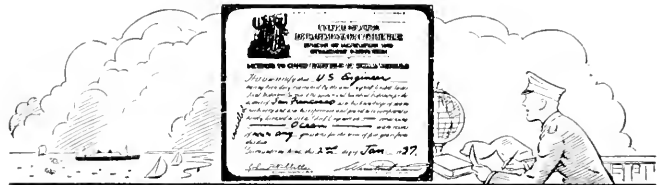
U. S. Lines' 22,846 gross-ton passenger ship WASHINGTON, ,nerica's second largest (at right), noses into Todd's Brooklyn ·rd for her first drydocking since her return to passenger service ·rly this year. After bottom painting and miscellaneous repairs, e left Todd's shipyard for Europe on her New York to Channel rts run, carrying over 1,000 passengers. The 15-year-old liner is 7 feet long, 86 feet wide, and 47 feet in depth. She saw war-he service as the troopship, MOUNT VERNON.

Big Lift

Left: A gantry crane easily lifts the 9½ ton aluminum smokestack onto the U. S. Corps of Engineers' dredge COMBER at the adjacent graving dock in Todd's Brooklyn Shipyard. The 39-foot funnel, the first aluminum stack constructed at Todd's fabricating shops replaces a 20-foot black iron stack but weighs the same despite its being nearly twice as high. The rivets are aluminum, too.



ht: A worker crouches inside the double-chute of the minum ship funnel made by Todd's Brooklyn shipyard, give an idea of its size. The stack scales only 9½ tons, out the same as the unit it replaced which was, however, black iron and half as long. It is 39 feet long, 21 feet e and aft, and 13 feet in breadth, and was installed on U. S. Corps of Engineers' dredge COMBER.

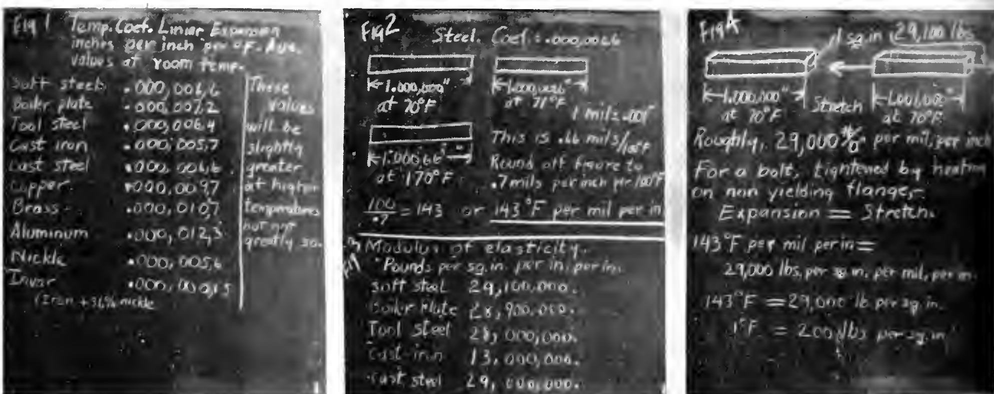


Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

"CHALK TALKS" ON APPLIED MATHEMATICS



Blackboard figures 1 to 4 mentioned in the text.

Thermal Expansion and Bolts

OUR LAST ARTICLE showed that because of friction, the mechanical advantage of the screw was limited and most of the lift or load or squeeze action of a bolt was due to the leverage of the wrench and length of its handle. Furthermore, as bolts were made larger with larger threads the compression from the screw action became less rather than more. Larger bolts should give more compression, but instead, gave less per unit area. Therefore the handles of wrenches for large bolts must be very long. If a 12 inch wrench handle is right for a ½ in. bolt and 24 inch for a 1 in. bolt, then we need 6 feet of wrench for a 3 in. bolt, by proportion of bolt

diameter. But the area of the bolt increases by the square of the diameter. A 3 in. bolt is 3x3 or 9 times as strong as a 1 in. bolt. 9 times 2 is 18 feet of wrench handle, which is impractical. Another way of obtaining the load or compression must be used besides the leverage of the length of wrench.

Great force can be applied by using a short heavy wrench and slugging it with a sledge hammer, for large bolts and studs, over 2 in. in diameter. The wrench must be a close fit to the nut, preferably a socket wrench. Otherwise the nut will be damaged. A heavy lubricant should be applied to the threads. And above all, a great deal of practical mechanical judgement must be used to avoid damage.

Pipe flanges seldom use bolts in excess of 7/8 to 1 1/4 inch bolts. Even exhaust trunks or gear housings, large as they may be, limit size of bolt to under 1 1/4 in. If strength is needed, more bolts are used, reducing the pitch or center to center distance.

The thickness of the flanges being bolted also limits the size of bolts. Bolt diameter will seldom be greater than the flange thickness. Frequently large bolts are used where the strength in tension of the bolt is not needed, but rather its strength in shear. For instance, the propeller shaft couplings use very large bolts, but to resist the torque of the shaft acting like dowels or keys. When bolts are used for shear they are carefully machined and the bolt hole is carefully drilled and reamed to give a "body bound" fit. It is necessary to drive the bolt in, as the fit is made without clearance. The bolt holes must be reamed to size after the flanges are aligned and tight together. Dowel holes are also drilled and if necessary reamed after the flanges are aligned and set.

Shaft coupling bolts must, of course, be large enough to resist the tension when the engines go astern and the propeller is pulling on the thrust block. This means that the threads and nuts must be large. But it still is unnecessary to develop this tension in the bolt when tightening the nuts with a wrench.

Therefore, it is important to divide the stress in two parts, that to squeeze the joint to make it tight against leaks if pressure is involved and that to resist a pulling apart force due to pressure or other mechanical action, such as bending moment or other pull. The stress for squeeze or tightness is called "pre-load" and once set up is always on bolt. The other is called shock or working load. The pre-load must be less than the maximum allowable stress by the amount of the expected working load.

When bolting onto gaskets there is some yield to the gasket so that an initial preload may reduce with time as the gasket yields with age.

When bolting large steam joints such as turbine cases, no gasket is used. The flanges are scraped to a matched fit. The great thickness necessary for strength makes a joint in which there is little or no yield once it is tight. A large preload must be set up in the bolts to make the joint steam tight. The large bolts necessary thus need to be sledged up or put in hot and tightened by thermal expansion. This makes a problem which can be calculated using the temperature coefficient of expansion and the modulus of elasticity.

Fig. 1 is a tabulation of the temperature coefficient.

An understanding of the meaning of the coefficient and modulus is necessary before these factors can be used.

As shown in Fig. 2, the coefficient is the increase in length in inches of a piece of metal one inch long as its temperature is increased one degree Fahrenheit. A mil is a unit of length equal to .001 inch and as shown, we may restate the coefficient to read for steel, as .66 mils or roughly .7 mils per 100 deg. F change in temperature for each inch of length. A steel rule 72 inches long at 100 deg. F would be .7x72 equals 50.4 mils shorter at 0 deg. F. This is .05 inches or about 3/64 inch.

Note in Fig. 2 the figure of about 140 deg. F per mil per inch, which should be remembered for steel.

The modulus of elasticity, Fig. 3, is the number of pounds per square inch stress which would stretch a piece of metal one inch long to two inches in length. (One inch per inch.) Of course the metal would break long before it was stretched this far, but the ratio is good for a small stretch such as one mil per inch. Note that about 30 million is a good figure to remember.

Fig. 4 illustrates this ratio. A stress of 29,100 lbs. per sq. in. will increase a one inch length of steel by one mil.

When a bolt is put in hot, and cools, it must stretch by the amount of the contraction. The contraction in cooling is equal to the expansion in getting hot over the same temperature change. This assumes, of course, that the flanges do not yield at all as the bolt squeezes on them.

We therefore can equate the amount of expansion over a given temperature change to the amount of stretch and we find that a one mil stretch requires 143 deg. F. change in temperature and 29,100 lbs. per sq. in. change in force or stress. Therefore, one degree F. temperature change gives about 200 lbs. per sq. in. stress.

Suppose we wish to preload the bolts to 10,000 lbs. per sq. in. We tighten all the bolts with a wrench to take up all clearance in the joint. Then we loosen the bolts one at a time, take one out and heat it up. 10,000/200 equals 50. We need to heat it to 50 deg. F. hotter than the flange. This is done in an oven. Then we insert the bolt, tighten the nut just a little over "hand tight" and let it cool.

If there is a hole through the center of the bolt we can heat it with a small flame torch. In this case we would bring the nut to the flange with no clearance, then heat the bolt until the nut had moved away from the flange a given clearance. Then tighten it again and let the bolt cool. With this method, a clearance of one mil per inch of bolt length would give us a preload of 29,100 lbs. per sq. in. We want 10,000 or 1/3 of this, so we would apply the torch until the clearance was 1/3 mil per inch of bolt length.

This concludes our series on mathematics applied to the screw bolt.

S. W. Simon

Port Engineer of the Month

SAN FRANCISCO

S. W. Simon

Of Pacific Far East Line

"Tex" Simon, so-called because he is a native of Texas and not because his name is Sylvester, worked in the construction business in South America before going to sea. At sea he worked up from Wiper to Chief Engineer on various lines, including the Robin Line, American-South African Line and Argonaut Line, all on the East Coast. In 1942 he went into the Navy, serving for two and a half years on a Navy Transport and two years on a Navy Cruiser as Engineer Officer.

"Tex" joined the Pacific Far East Line in 1946 in his present capacity of Assistant Port Engineer.

His enthusiasm for his work is carried over into his sparetime pursuits, for his hobby is marine engineering.

Flash!

Frank Smith announces a repeat on the highly successful Christmas dinner-dance of the San Francisco Society of Port Engineers. The Fairmont Hotel's Gold Room has been reserved again and the affair will be held on Friday evening, December 17.

--With The

San Francisco Society's July Meeting

At their July 7 meeting the Society of Port .Engineers enjoyed a two-part program. The first part was a technical lecture by John Kooistra of the Carrier Corporation on marine refrigeration from the vessel operator's standpoint. Kooistra's talk was extemporaneous. A more lengthy discussion of low temperature air conditioning was given at a meeting of the Naval Architects and Marine Engineers and is published elsewhere in this issue.

Two Bardahl Lubricant representatives, George E. Eggers and Ward Grisham discussed and demonstrated the protection offered with lubricant oils or greases. Bardahl is a lead base lubricant that can be added to any good engine lubricant to increase its lubricating film strength, thereby reducing engine wear and costly engine failures at sea. Due to its affinity for metal, Bardahl provides thin film lubrication that will not break down under high temperatures and pressures. Its use has resulted in increased engine performance, corrosion reduction and the assurance of longer operation of equipment that is subject to lubrication breakdowns.

Top picture, left to right: Milo Atkinson, George Eggers, Ward Grisham, Ray Sample, M. C. Wright, Phil Thearle. Eggers and Grisham, representatives for Bardahl Lubricants, demonstrated the product at the July meeting of the San Francisco Port Engineers.

Below, left to right: Jack Harris, William Sizemore, William Kurtzman, Hugh Morrison, Capt. Thomas Klitgaard, Andrew Disher, Joseph Check.

Port Engineers-

Board of Governors

The Board of Governors of the San Francisco Society in session preceding their regular meeting. Left to right: Phil Thearle, Ira Chapman, Marshall Garlinger, Harold Wrigley, Ed Graff, Ray Sample, Harry Thompson, Jim Riemers.

The Speaker—John F. Kooistra

John Kooistra, speaker for the July 7 meeting of the San Francisco Society, has quite a history of engineering experience. Born and educated in the Netherlands, he graduated as a mechanical engineer in 1924 and came to this country to practice in Chicago. In 1929 he joined the Carrier Corporation, specializing in refrigeration and air conditioning for industrial applications. He was appointed to head the San Francisco office of Carrier in 1937. Since that time he has specialized in marine refrigeration and has gained considerable recognition as an authority on that subject.

He is past chairman of the local chapter of the Society of Heating and Ventilating Engineers and of the Society of Refrigeration Engineers, a member of the Society of Naval Architects and Marine Engineers, and the author of several engineering papers covering subjects dealing with air conditioning and refrigeration for industrial and marine applications.

John Kooistra (left) and Marshall Garlinger.

"Mike" Kelley

Port Engineer of the Month

LOS ANGELES

Morriss Heremon Kelley

Of Richfield Oil Corporation

Born in 1916, "Mike" Kelley attended Howard College, Birmingham, Alabama, for a year and a half and the New York State Merchant Marine Academy at Fort Schuyler, New York. He sailed in various licensed capacities with the United Fruit Company and the Standard Oil Company of New Jersey until 1941 when he went ashore to work for the Bethlehem-Fairfield Shipyard, Baltimore, Maryland, first as Assistant Foreman and later as Assistant Machinery Superintendent.

Called to active duty in the U. S. Navy in 1942, "Mike" spent three years on destroyers as Engineering Officer for his own ship and squadron. He joined the staff of the Deconhil Shipping Company as Assistant Port Engineer in 1945 and assumed his present position as Assistant Port Engineer with the Richfield Oil Corporation in 1947.

"Mike's" great love is ships and this enthusiasm is carried over into his sparetime pursuits.

Running Lights

National Lead Company's New L. A. Plant

J. A. Martino (left) president of National Lead Company, and James L. Caruth, manager of the Pacific Coast division (right(pose for PACIFIC MARINE REVIEW photographer with other executives of the company, including old-timer James B. Kiester, former Coast manager.

Official opening of National Lead Company's new Southern California paint factory was celebrated on July 14 when Joseph A. Martino, president of the company, accompanied by national and regional officials and representatives of local civic organizations made a formal tour of the plant and started the machinery of the factory turning in full-scale production.

The new plant, located on a five-acre tract at 3113 East 26th Street, in Los Angeles, includes the three-and-a-half story factory building, the 38,000 square foot warehouse and a two-story office building housing executive and sales staff for the Southern Division of the Pacific Coast Branch.

Representing the last word in modern paint factory design, this newest unit in the National Lead network of plants provides for gravity flow of materials in process, eliminating much of the human equation involved by handling and reducing possibility of inaccuracies in formulation to a minimum; provision for rapid and easy increase in production facilities, and full safety precautions and provision for ideal working conditions for employees.

The layout of the plant provides for the simplest routing of raw material from railway siding or truck unloading platform back to those points in the form of finished Dutch Boy Paints.

All liquids used in the production operation are stored in tanks located outside of the factory building. They are drawn directly from tank cars on the rail siding into twenty above-ground or six below-ground tanks. Total storage capacity now available is 170,000 gallons. Each group of tanks is enclosed in a concrete-walled pit capable of holding the entire liquid capacity of the tanks so contained. In the adjacent pump-house are twenty-four individual pumps maintaining constant pressure in the pipe lines leading to the factory. Pumps automatically start when pressure is released by the filling of weighing tanks in the plant.

Over one mile of pipe lines convey liquids from the tanks to the distribution system on the roof of the factory building. The pipe bridge has a vertical clearance of 60 feet over an area set aside for future plant construction.

Dry pigments are transported to the upper floors of the plant by means of a 15,000 lb. capacity elevator equipped with the latest type of safety doors that prevents possibility of movement during loading or unloading operations.

The third or top floor of the factory is devoted to mixing operations and dry pigment storage. A battery of mixers at floor level are easily charged with dry pigments. Hoppers for pebble and steel ball mills are also

Newly-completed paint factory occupies 3½-story building at right center. Entrance to office at left; warehouse with truck entrances and spur track in center; tank storage at upper right.

Top: Dutch Boy Paints flow from mills as Joseph A. Martino, president of National Lead Company, sets wheels in motion at official opening of new plant in Los Angeles on July 14, 1948. Left to right: H. S. Irwin, manager Southern Division; B. O. Miller, president Los Angeles Chamber of Commerce; W. A. Smith, County Supervisor, Los Angeles County; Joseph A. Martino, president, National Lead Company; James L. Caruth, manager, Pacific Coast Branch.

Bottom: Tank storage and loading docks are shown in the foreground with recently-opened paint factory in background.

located here at floor level.

Pigment dust is quickly drawn from this equipment into the dust collector located on the roof assuring maximum protection to the men tending this equipment. No dust, fumes or smoke leaves this plant at any point in the operation.

Liquids, unless too viscous for transportation by pipe line, are pumped from the tank farm to a weighing tank on this floor and are run by accurate gauge measurement into the mixers.

The next floor is a mezzanine containing the mill equipment—a pebble mill, Hy-R-Speed mill, five-roller mill, two three-roller mills and three steel-ball mills. Pastes flow from the mixers on the floor above directly into the mills. Pebble and ball mills are charged from hoppers located on the floor above also.

Thinning and tinting are done on the second floor in twenty-six floor-level tanks. Pastes are drawn from mills above into these tanks, thinners are weighed in a scale tank located in the area next to the mezzanine level and colors as required are added by the tinters. Turbine-type agitators in thinning tanks are driven by separate motors with reduction gears attached directly to the agitator shafts. This permits a shut-down of any single tank without disturbing the rest of the operation. The laboratory is located on this floor to facilitate checks of all batches for color, gloss, drying time, consistency, weight and flow. In addition to the main laboratory room, this unit contains balance room, dark room, chemical analysis room and offices. Factory offices are adjoining.

Filling by means of mobile paint filling machines which can be set up under any one of the thinning tanks is done on the first floor. Cans are filled to correct volume automatically and capped mechanically. Transported by pallet to the labelling room, cans pass through the labelling machine and are placed in cartons which are marked and sealed mechanically in the next operation.

In addition to maintaining a dust-free, fume-free atmosphere, the provisions for workers' health and safety have eliminated such hazards as open mixers and unguarded moving parts. Gravity flow and power-lifting avoid unnecessary exertion or possibility of injury from dropping of heavy materials. Ample window space with strong light from north, non-glare artificial lighting and use of contrasting colors on equipment not only complete the safety precautions but assure pleasant working conditions.

Expansion of production facilities is provided for by a duplication of space for equipment on each floor and by an area of ground set aside directly to the north of the present building for an identical structure in the future.

The new plant will be under the general supervision of James L. Caruth, manager of the Pacific Coast Branch; C. E. Campbell is factory superintendent.

Visitors toured the several divisions of the new plant . . . warehouses, shipping floors, pump houses and the main factory building . . . with company men as guides.

A Shipyard Has to be Versatile

M.S. HOEGH TRADER, Lief Hoegh and Company. New passenger dining saloon looking to port side and aft, showing panelling, dining tables, side board, etc.

During the past several years Moore Dry Dock Company has been specializing in the field of interior refinishing and decorating on merchant ships. The first postwar work of this character was performed on the S. S. *Philippine Transport* for the Pacific Transport Lines, and was followed by the *Pacific Transport* and *China Transport* for the same company. These vessels are standard Maritime Commission C-3 cargo ships.

In the accompanying illustrations are shown the conversions on the S. S. *China Transport* and the M. S. *Hoegh Trader*. The lounge on the C-3 is located on the cabin deck forward and to starboard of the dining salon. Both of the spaces were stripped to bare steel and panelled with fumed oak. Special lighting arrangements were designed to fill out the modern motif of the design. As space was limited in the dining salon, mirrors were used at each end of the room to add a sense of depth.

All new furniture such as tables, chairs, sideboards and couches, were designed to take full advantage of the allotted space. Bright fabrics and attractive fixtures complete the picture of shore-side comfort in a ship-shape fashion.

During this same period two U.S.M.C. standard C-1-Ms were converted for Norwegian owners, namely the M. S. *Skaubo* for Salén-Skaugen Lines and the M.S. *Hoegh Trader* for the Leif Hoegh Line operating for Kerr Steamship Company.

The main dining salon on the *Hoegh Trader* was panelled in natural finish mahogany. Here again the space allotted called for careful design and planning. The furniture is all mahogany to match the panelling. Special fixtures and matching colors in the fabrics develop a pleasing appearance that is both practical and warm.

All of these conversions were done while the vessels were at loading berths. In the case of the Pacific Transport Line C-3s, one space was started and completed each voyage. Thus the entire installation was completed in three voyages without delay in the vessel's turnaround time.

On each of the Norwegian vessels a similar plan was worked out. Their schedules were such that they would call at San Francisco, discharge and then go North. At this time much of the preliminary work was done, such as all the removal of old equipment and panelling, etc. As much of the new panelling, wiring, etc. was installed as time allowed. All measurements were taken, so that while the vessels were North all preparatory work could be completed. On the return of the vessels to San Francisco the installations were completed, again without loss of terminal time.

S. S. CHINA TRANSPORT, Pacific Transport Lines, Inc.

The reconverted dining saloon. Panelling and furniture are in matching fumed oak.

The new lounge on starboard side looking forward. Panelling and furniture is finished in matching oak.

Port of Portland
Completes Successful Development Program

The objectives laid out just two years ago by Portland's ambitious Port Development Committee are already 90 per cent completed, according to its newly appointed commissioner of Public Docks, Captain D. J. McGarity. McGarity, whose former title was "Port Director"— administrative officer for the committee— stepped into his new post July 1 with a fine record.

Some of the important accomplishments of the Committee have been:

1. Increase in the number of steamship lines operating out of Portland. Over fifty lines now stop there regularly, many of which were solicited under this program.

2. Installation of a 14,000-ton steel dry dock.

3. Purchase of a terminal for a lumber assembly plant, resulting in an increase of lumber tonnage through the Port.

4. Development work aimed at increasing volume from middle western shippers. This is still a major project with Portland, carried on independently and in conjunction with other coast port groups.

5. Development in direct volume of imports and exports. The Committee points to a 76 per cent increase in exports, and 53 per cent increase in imports—1947 over 1946.

6. Insistance that ships calling regularly at Portland purchase an equitable share of their stores at that port. (Portland has not heretofore been a major supply source, even though it enjoys a sales tax advantage over California and Washington ports.) Money now spent, running into the millions, benefits the entire community.

7. Establishment of a working liaison with other ports of the Columbia Basin.

8. Development, with the Army Engineers, of the Columbia, Willamette, Snake, and tributary rivers.

9. Increasing efficiency of handling to and from barges by building of new elevators, and general improvements.

10. Work toward establishment of a free switching zone. This is now a 90 per cent reality in the Portland area.

11. Promotion to make Portland "home port" for as many ships as possible. Several lines have signed or are expected.

12. Fostering study of the economic possibilities of direct Portland-Alaska sailings. (One interesting fact turned up was that 70 per cent of Alaskan supplies originate in the Portland area.)

The Port announces that, starting this month, approximate fortnightly sailings will be made by Coastwise Lines on a Portland-Seward service.

Work on these and other important projects will continue, though the directing office of Port Director is now consolidated within that of the Commission of Public Docks under the direction of Captain McGarity.

Captain McGarity

An old-time merchant mariner, Cap'n McGarity went from A.B. to Master on the Great Lakes, obtaining the latter ticket in 1915 from the old Goodrich Steamship Company. He served as assistant and general superintendent of that Company from 1925 until its liquidation in 30-31. He then went to Clyde-Mallory and other lines out of New York. From shoreside duties ahead of the War he was pulled into O.D.T. by its head, Joe Eastman, who remembered McGarity's old shipping connections, and he was sent to Portland in 1942 to set up the Port for the Russian program.

In 1945 he was made an associate director of the O.D.T., and was in charge of all West Coast activities until May 31, 1946. He went directly from this job to that of Port Director for Portland. (Portland's definition of the term "Port Director" is that of a trade and port development director—nothing like the Navy's wartime cargo and passenger control.)

After two successful years in this job he became Commissioner of Public Docks but retained some of his former duties in the consolidation of the two jobs.

Pacific MARINE REVIEW NEWS FLASHES

BILLION DOLLAR NAVY CONSTRUCTION; PACIFIC TO GET MANY MILLIONS

As we go to press, the Navy announces contracts relating to 33 ships, many of which will be newly constructed. Mare Island, Hunters Point, Puget Sound and Long Beach Navy Yards will participate. The new giant 65,000 ton carrier goes to Newport News. Other Eastern yards included in programs are New York Shipbuilding Corp., Bethlehem-Quincy, and Bath Iron Works.

* * * * *

GENERAL MANAGER FOR MARITIME COMMISSION

Charles D. Marshall has been named general manager of the Maritime Commission in Washington. He will have the duty of expediting the business of the Commission and relieving the members of operating details.

* * * * *

U. S. LINES OFFERS 25 MILLION FOR BUILDING SUPER LINER

The Maritime Commission reports that the United States Lines has offered to contribute as its share 25 million toward a total of about 65 million for the construction of a super liner which will be the largest in the world. There seems some likelihood that the Commission will accept. (Artist's sketch and picture of model of this vessel have appeared in earlier issues of the PACIFIC MARINE REVIEW.)

* * * * *

U. S. LINES BUYS LINER AMERICA

The 26,000 ton liner AMERICA, built by the U. S. Lines and purchased by the government for wartime operation as the WEST POINT, is again the property of U. S. Lines. This deal is significant as indicating confidence in the future of provately operated passenger ships. The U. S. Lines has been delaying the action since the end of the war.

NEW COMMANDER AT HUNTERS POINT

Succeeding Captain Philip Lemler, who has become vice president of Todd Shipyards, is Captain Hugh E. Haven.

* * * * *

DIESEL MANUFACTURERS CONFERENCE

The Diesel Manufacturers Association announces a conference to be held in Berkeley and Richmond, California, beginning August 16. The Berkeley session will be at the University of California and the Richmond session at California Research Corporation.

* * * * *

BIG TANKERS AND CARGO SHIPS TO BE BUILT IN JAPAN

The American Bureau of Shipping has a representative en route to Japan to checks the plans of two 18,000-ton tankers proposed for construction in Japan for foreign interests and three 3200-ton cargo vessels. It is expected that the tankers will be operated from the Persian Gulf area to Europe.

* * * * *

LINERS MARIPOSA AND MONTEREY

Congress recently extended until September 30 the Maritime Commission's right to spend $99,000,000 left over from the last fiscal year's appropriation and gave the Commission authority to acquire and complete the reconditioning of the Matson liners MARIPOSA and MONTEREY. Commissioner Carson's survey of the situation has been completed and his recommendation to the Commission is expected momentarily.

* * * * *

TANKERS FOR TEXACO

The Texas Company has contracted with Bethlehem's Quincy Division for the construction of four 28,000-ton tankers and the first keel will be laid in September. These tankers are similar to those mentioned in previous announcements for several oil companies and will be 623 feet long with a capacity of 240,000 barrels. They will have a surface speed of 16 knots at 12,500 horsepower. In all-over particulars the new ships will be some 75 per cent larger than the T-2.

* * * * *

SEAPLANE TENDERS TO BE CONVERTED FOR COAST GUARD

The Twelfth Naval District at San Francisco announces that seven seaplane tenders from the Pacific Reserve Fleet are being loaned to the Coast Guard for ocean weather surveys in the North Atlantic and are to be converted for the Coast Guard at Hunters Point Naval Shipyard. Eight additional vessels of the same type in the Atlantic Reserve Fleet will be converted at Orange.

* * * * *

STEAMSHIP COMPANIES HAVE BIG FUNDS FOR CONSTRUCTION

A recent compilation of balances available in statutory reserve funds indicates that twenty-nine lines have on deposit about $150,000,000 for new construction. Of this total $119,000,000 is maintained by twelve subsidized lines and $31,000,000 by domestic lines.

MOORE-McCORMACK PROPOSES TWO NEW LINERS FOR SOUTH AMERICAN SERVICE

The Moore-McCormack Company has a proposal before the Maritime Commission to invest 20 million as its share of the cost of two new passenger liners that would total between 50 and 60 millions for the South American run.

* * * * *

STANDARD-VACUUM CHARTERS UNBUILT TANKERS

Long-term charter arrangements covering four large tankers which are still in the drawing-board stage were announced by Standard-Vacuum Oil Company. The tankers will be built at the Bethlehem-Sparrows Point shipyard in Maryland starting immediately. Each will be 16,500 DWT, with an over-all length of 487 ft. 6 in. and moulded beam of 68 ft. They will draw less than 30 ft. of water when in ballast.

* * * * *

APL'S V-2000 PROGRAM APPROACHING DEADLINE

Almost continuous conferences between President Killion of American President Lines and the Maritime Commission developed the possibility that V-2,000 ships for round-the-world service will soon be ordered. The New York Shipbuilding Company's low bid has been extended at the request of the Commission. It is possible that three ships will be built instead of five.

* * * * *

TEN MILLION DOLLAR MONTHLY PAYROLL FOR BAY AREA NAVY

In a pay survey now in progress in the San Francisco Bay Area, it is disclosed that there are about 41,500 employees in San Francisco Bay Area Naval installations with a monthly payroll of about $10,000,000.

11,000 are employed at Hunters Point, Naval District headquarters, and Treasure Island. 30,500 are at Mare Island, Naval Supply Center, Naval air stations at Oakland and Alameda, and at Richmond, Port Chicago and Tiburon.

* * * * *

MOORE WEST YARD OFFERED FOR SALE

The War Assets Administration office at San Francisco will receive bids until September 13 for the purchase or lease of West Yard docks, berths, buildings, machinery, cranes and other equipment at the old Moore Dry Dock Company's West Yard. The West Yard has no present connection with the Moore Dry Dock Company.

* * * * *

CONSOLIDATED STEEL AND WESTERN PIPE

Effective July 1, 1948, the name of this corporation will be changed to "Consolidated Western Steel Corporation." Also after that date the South San Francisco, Vernon, Fresno, Bakersfield, Taft and Phoenix plants of Western Pipe & Steel Company of California and the Berkeley plant of The Steel Tank & Pipe Company of California (both of which corporations are wholly-owned subsidiaries) will be operated as units of this corporation under its new corporate name.

Harbor Supply Expands to Portland

General Manager of the Harbor Supply Co., Inc., A. F. Devoto, recently announced the expansion of the firm to Swan Island in Portland, Oregon. The ship chandlery firm now maintains a warehouse there stocked with deck, steward and engineers supplies and they have day and night service.

Nationally known manufacturers represented by the company through their Portland branch include Great Western Cordage Co., manila rope; Bethlehem Steel Corporation, wire rope; Boston & Lockport Co., tackle blocks; Wilcox Crittenden Co., blocks and shackles, The Young Iron Works, blocks and shackles; Walworth Co., valves; Columbia Steel Co., wire products, steel and sheets; Griffin Manufacturing Co., hinges and butts; Pheoll Manufacturing Co., screw products; Bright Star Battery Co., flashlights and batteries; Band-it Co., clamps and tools; Thomas Laughlin Co., shackles, hooks, etc.; Diamond Calk and Horshoe Co., wrenches and pliers Halstead Products Co., oils (cutting and penetrating); Palmer Thermometers; Bell & Gossett, heat exchangers and centrifugal pumps; Fulton Sylphon Co., temperature controls; Pioneer Rubber Co., hose and packing; Anchor Packing Co., gaskets and packing; Alemite Co., fittings and greases; Pyrene Co., fire extinguishers; Leetonia Co., scrapers; Chase Brass & Copper Co., brass and copper pipe, tubing and fittings; Wilbur & Sons, life saving equipment; Atlantic Pacific Manufacturing Co., ring buoys; Permatex Co., gasket compounds; Heller Bros. Co., tools and files; Simonds Saw & Steel Co., saw blades; Victaulic Inc., Victaulic couplings; Osborne Manufacturing Co., wire, fiber and paint brushes; Dixon Crucible Co., lubricating graphites.

Top: Second floor (fittings department).
Center: Don Johnson and Fred Latson on second floor where valves and blocks are kept.
Bottom: Stock of manila rope, left, and chain, right.

Warehouse of Harbor Supply Company in Portland.

Leif Hansen
Of International Ship Cleaners, Inc.

A growing organization in the San Francisco region is Leif Hansen's International Ship Cleaners, Inc., vessel maintenance service with headquarters at 863 Harrison Street. The firm is engaged in tank, boiler, and chemical cleaning, sand blasting and ship painting.

Leif Hansen received his engineering apprenticeship in Norway and studied Diesel engineering in Germany at the M.A.N. factories. For several years he sailed as an engineer on Scandinavian and Panamanian ships. He took examinations in Rhode Island to change his license in order to sail on American ships. During the war Hansen served in the Army as a ski instructor of the Mountain Troops stationed in Colorado. Before the war terminated he received an honorable discharge and was then appointed by Maritime Chemical & Repair, Inc. in New York as a superintendent of operations. The company sent him to California to work in conjunction with Harry W. Parsons in San Francisco. Hansen has since been active in chemical cleaning and ship repair in San Francisco and the Bay Area.

Leif Hansen and Mrs. Leif Hansen, office manager.

Arthur H. Abel

Port Manager and Chief Engineer of the Port of Oakland, Arthur H. Abel has been with the Port of Oakland continuously since its inception in 1926.

Born in Walla Walla, Washington, he is a graduate of Washington State College where he received a civil engineering degree. He engaged in railroad surveying and construction work for the Hill system and the Northern Pacific in the northwestern states, and in 1908 entered private engineering practice in Portland, Oregon, with the late G. B. Hegardt, engaging in general civil engineering, including construction, irrigation, logging roads, dredging, etc.

Abel and Hegardt transferred to the newly formed Commission of Public Docks in Portland in 1910 and started the construction of the port facilities there. Abel's first assignment was as assistant to Hegardt, who filled the position of Chief Engineer and Port Manager for Portland. He remained in that position from 1910 to 1926, during which period they directed the operation of the port and carried out a ten million dollar harbor development plan to completion.

When Oakland decided to form the Port of Oakland and the Oakland Board of Port Commissioners to operate and administer the municipal harbor facilities, Hegardt and Abel were called to Oakland to launch the development program in the early part of 1926.

The two men carried out the engineering work which resulted in the construction of the Outer Harbor Terminal, the Grove Street Terminal, Ninth Avenue Terminal, the Oakland Municipal Airport, and other Oakland harbor developments. With Hegardt as Port Manager and Chief Engineer, and Abel as Assistant Port Manager and Assistant Chief Engineer, the two men were responsible for the carrying out of the Port of Oakland's Master Plan, an integrated program of development which has guided Port construction throughout the years and which is still the blueprint for the Port's further development in the future.

Hegardt retired as Port Manager and Chief Engineer in 1932, and Abel was appointed to succeed him later that year. He has guided the administrative, engineering, and operational destinies of the Port of Oakland and the Oakland Municipal Airport under the direction of the Oakland Board of Port Commissioners continuously since that time.

Arthur H. Abel

Vice Admiral George D. Murray, U.S.N.

Navy Appointments

Vice Admiral Lynde D. McCormick, U.S.N.

Vice-Admiral Murray

Vice Admiral George D. Murray has been ordered to assume duties as Commander, Western Sea Frontier and Commander, Pacific Reserve Fleet, the Headquarters Western Sea Frontier recently announced.

Admiral Murray served as Commander of the First Task Fleet prior to his appointment to his new command.

During World War II Admiral Murray served as commanding officer of the U. S. S. *Enterprise* and in 1943 he became the first Commander of the Naval Air Training Center and at the same time Chief, Air Intermediate Training, Intermediate Training Command at Pensacola, Florida.

Admiral Murray will relieve Rear Admiral Donald B. Beary, Commandant of the Twelfth Naval District, who has also served temporarily as Commander, Western Sea Frontier and Commander, Pacific Reserve Fleet, since the retirement of Vice Admiral Oldendorf.

Vice-Admiral Lynde D. McCormick

Vice Admiral Lynde D. McCormick, USN, has been ordered to assume duties as Commandant, Twelfth Naval District, with offices in the Federal Office Building, Civic Center, San Francisco.

Admiral McCormick served as Commander of Battleships-Cruisers Atlantic Fleet prior to his appointment to his new command.

During World War II he served as War Plans Officer on the staff of Fleet Admiral Chester W. Nimitz, USN, from February 1, 1941 to January 14, 1943—the critical period during which the battles of the Coral Sea, Midway and Guadalcanal were fought. For his outstanding services as War Plans Officer he was awarded the Legion of Merit. As commander of a Battleship Division during the Okinawa campaign, he contributed materially to the success of the landing operations and was awarded a Gold Star in lieu of a second Legion of Merit for his exceptionally meritorious conduct and service.

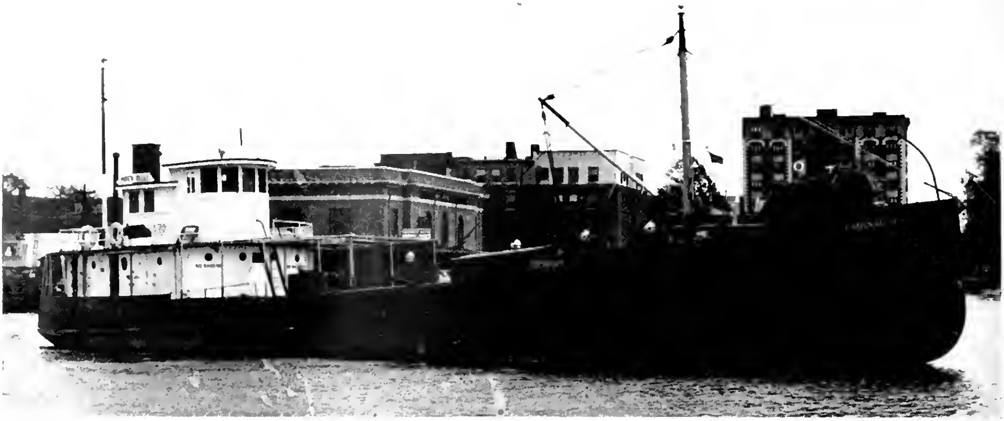
Admiral McCormick will relieve Rear Admiral Donald B. Beary, USN, who has served as Commandant of the Twelfth Naval District since April 1, 1946, and as Commander, Western Sea Frontier and Commander, Pacific Reserve Fleet temporarily—since the retirement of Vice Admiral Oldendorf.

Burley Joins Conference Group

Ray F. Burley, who has been a mainstay of the freight operations of Pope and Talbot and predecessor corporations since 1921 has resigned to become chairman of the Pacific Coast River Plate Brazil Conference and the Latin American Conferences. Since 1936 Burley has been freight traffic manager of Pope and Talbot, succeeding J. C. Strittmatter. He is licensed to practice before the Interstate Commerce Commission and the Maritime Commission and was president of the Transportation Club of San Francisco in 1944 and 1945.

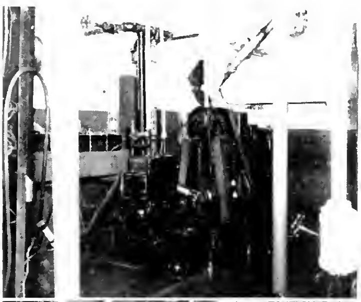
Ray is an avid collector of baseball pictures and statistics on the game. His versatility in this direction is evidenced by his acquaintanceship with both players of renown and umpires of reproach.

Ray F. Burley



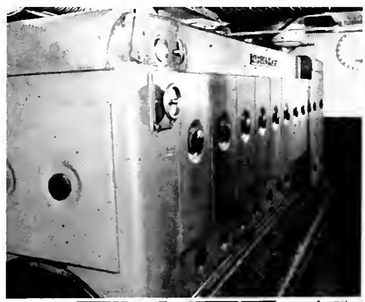
The oil tanker Haven Belle aboard which the Model 31-A, Fairbanks-Morse Marine Diesel Engine has made one of its most recent debuts on the Atlantic Coast.

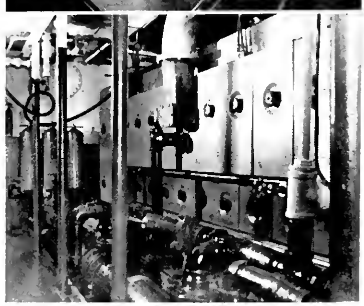
Fairbanks-Morse Diesels on River Tanker "Haven Belle"



Top: The auxiliary unit is a single cylinder Model 36 engine. It powers a Fairbanks-Morse 2½ K.W. Generator, Type-H Air-compressor, and a Bilge-pump.

Bottom: The single 2:1 Reduction Gear is mounted at the factory on the same base with the engine to insure proper alignment and is included in its overall length.





The trim, marine diesel engine (above) perfected by Fairbanks-Morse is a 20th Century Diesel.

Bottom picture shows the exhaust side of the engine with lubricating oil filters, oil cooler and jacket water heat exchanger.

Dayhoff Appointed By L. A. Harbor Dept.

Announcement of the appointment of Clancy W. Dayhoff, 20-year veteran of the air transportation industry, as Director of Public Relations for the Los Angeles Harbor Department, has been made by Arthur Eldridge, General Manager.

Dayhoff will be in charge of advertising, publicity and public relations, according to Eldridge. Prior to joining the Harbor Department, Dayhoff was western director of Public Relations, Route Development and State Relations for Trans World Airline.

A former newspaperman in Sioux City, Iowa; Butte and Helena, Mont.; and Los Angeles, Dayhoff entered air transportation in Los Angeles for Western Air Express in 1928. Later he served as Public Relations and Advertising Director for Eastern Air Lines and TWA, in New York City, Chicago and Kansas City when all three companies were controlled by General Motors. During the war he was western director of Sales and Service for TWA and returned to public relations activities in 1945.

While on leave of absence from TWA early this year, Dayhoff acted as Public Relations Director for the City of Los Angeles on the five-day re-dedication of the Freedom Train to the West Coast during February.

George Swett Company Appointments

Richard (Dick) Wolcott has joined the George E. Swett & Co., Engineers, Inc., of San Francisco, as manager of Purchases and Stores. A native of Fresno, California, and a graduate of Stanford University, Wolcott has been connected in various capacities with the Bethlehem Steel Company, and the United Engineering Company of San Francisco.

Robert Dill, long-time employee of the George E. Swett & Company, Engineers, has been appointed superintendent in charge of new installations and service for refrigeration, air conditioning and Diamond Soot Blowers. Dill will replace Henry Buffalow who has resigned. H. J. Wickert and John Marsh will continue as sales manager and chief engineer respectively.

Sperry Sales Climbing

Accelerated radar sales are rapidly lengthening the individual customer list compiled by Sperry Gyroscope Company, it has been announced by O. B. Whitaker, marine sales manager. Forty-eight separate domestic marine operators and thirty-six foreign customers comprise Sperry's current list.

Kenneth D. McGrew, president,
Van Arsdale-Harris Company.

Van Arsdale-Harris Incorporates

Van Arsdale-Harris Company, San Francisco firm of engineers, contractors and distributors, recently changed from a partnership to corporate organization.

Officers of the company are Frank H. Harris, chairman of the board; Kenneth D. McGrew, president; N. V. Micheli, Vice President; Leonard J. Kupps, secretary; C. E. Needham, treasurer; and Clyde M. Plants, assistant treasurer.

The appointment of Charles Ayres, marine engineer, as marine and waterfront representative is also announced. Ayres is the son of Captain Charles Ayres of Pacific Tankers. At one time he was with United Engineering.

Van Arsdale-Harris specializes in marine and industrial insulation, sound control, asbestos products and cold storage construction. The company is exclusive Northern California and Western Nevada distributor and applicator for The Philip Carey Manufacturing Co., The Cork Import Corporation, National Gypsum Company; Jamison Cold Storage Door Company and Cornell Wood Products Company.

International Paint Elects Horton To Board

International Paint Company, Inc. of New York announces the election to its Board of Directors of George A. Horton of Pagel, Horton & Co., Inc., New York City. Horton is the father of George A. Horton, Jr., Vice President of International Paint Co., Inc., San Francisco.

H. G Rethmeyer

Westinghouse Names Rethmeyer To New Post

H. G. Rethmeyer, since early 1947 Pacific Coast manager for the marine and aviation divisions of Westinghouse Electric Corporation, has been placed also in charge of the company's transportation sales in that area. Announcement of Rethmeyer's new appointment was made here by Chas. A. Dostal, Vice President.

An electric engineering graduate of Kansas State College, Rethmeyer joined Westinghouse at East Pittsburgh, Pa., in 1926 as a graduate student. He was transferred to San Francisco in 1930 as a marine and transportation salesman, then went to the company's Seattle, Wash., office on a similar assignment. On January 1, 1947, he returned to San Francisco as marine and aviation manager.

Smith New De Laval President

H. L. Watson, President of De Laval Steam Turbine Co., Trenton, N. J., has retired after 35 years of active service, and George W. Smith, Jr., has been elected as his successor. Watson will continue to be part of the company's management in the capacities of a director and chairman of the executive committee.

Before becoming associated with De Laval in 1947 as assistant to the president, Smith served successively as vice president and director of the White Motor Company, as works manager and a member of the executive committee of the Victor Talking Machine Company (now Victor Division of RCA), as manager of two divisions of Bendix Aviation Corporation, as a director of the Ohio Crank Shaft Company, and as chief engineer of the Naval Aircraft plant at the Philadelphia Navy Yard. More recently he has been engaged in industrial engineering consulting services as the senior member of the New York firm of Smith and Wood, Inc.

Watson directed the affairs of the company as executive vice president from 1935 to 1942 and as president since 1942. During his administration De Laval products were established as leaders in the marine and industrial fields which are supplied with reduction gears, worm and helical gears, steam turbines, generators, centrifugal and rotary pumps and centrifugal compressors.

George W. Smith, Jr.

John Green Joins Todd Pacific

The appointment of John Green as General Superintendent of Todd Pacific Shipyards Corporation's Bay Area ship repair operations, was announced recently by Philip Lemler, Vice-President and General Manager of the Corporation.

Green succeeds Nick Lehman, who is retiring after more than 30 years' service in the ship repair business in San Francisco with United Engineering and Todd Pacific.

Green, who is well known in both American and foreign ship operating industries, has recently been manager of the marine department of McCutcheon and Sons, ship joiner manufacturers. He has been identified with shipbuilding and ship repair work since the first World War, holding responsible positions in both design and production fields. During World War II, he was manager of the Tacoma Shipyard for Todd, supervising the construction of over a hundred vessels for the Maritime Commission and the Navy, including tankers, C-1s, C-3s, and escort carriers, more popularly known as "baby flat tops".

The Todd organization recently acquired United's extensive facilities at San Francisco and Alameda.

G. Joseph Keady

Keady Elected President Of Sharples Corporation

At a recent meeting of the Board of Directors of The Sharples Corporation, G. Joseph Keady, Executive Vice President, was elected president of the corporation. Philip T. Sharples, President, is now Chairman of the Board.

The company is engaged in the development and invention of chemical processes for industry, and the manufacture of equipment, mainly high speed centrifuges, for the operation of those processes. Their principal plant is in Philadelphia. Wholly owned subsidiaries are located in London, England, and in Paris, France. Sales offices are located in principal cities in the United States and agencies for the sale of Sharples products are located in twenty-six foreign countries.

An affiliated company is Sharples Chemicals, Inc., with general offices in Philadelphia and plant at Wyandotte, Michigan. The Sharples Oil Corporation, with headquarters in Denver, Colorado, is a wholly owned subsidiary.

Olympic Steamship Company Moves

The Olympic Steamship Company, Inc. of Seattle have moved to a new location at Pier 28, 231 East Marginal Way, Seattle. Their telephone number, Main 4520, will remain the same, and also their teletype number, Seattle 269.

Bethlehem Builds Big Brooklyn Barges

The Brooklyn Eastern Terminal District Carfloat No. 25, shortly after its launching by Bethlehem Steel Company's Staten Island Yard July 8. The two-track platform unit is the third carfloat built for BEDT at the Staten Island Yard this year. A fourth float is now under construction. All of the craft have an overall length of 290 feet, beam of 40 feet and depth of 10 feet 6 inches.

President Cleveland Warranting Ceremonies

Official U. S. Navy Photograph.

Staff Headquarers personnel of the Twelfth Naval District and American President LLine Officials on board the SS President Cleveland during warranting ceremonies. Left to right: M. J. Buckley, Senior Vice-President, American President LLines; Captain R. LL. Hanson, Inspector-Instructor, Naval Reserve; Captain T. R. Wirth, District Public Information Officer, Twelfth Naval District; H. J. Ehman, Master, SS President Cleveland, Lt. Cdr., USNR; Chief Officer Orian A. Larson, Lt. USNR, Rear Admiral Donald B. Beary, then Commandant of the Twelfth Naval District; Captain F. W. Wauchope, District Representative, Merchant Marine Naval Reserve; and Lieutenant Richard G. Lindsey, Aide to Commandant Twelfth Naval District.

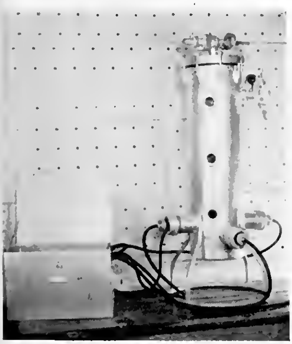
Marine Refrigeration System Cleaner

Fred Esser, president, and Jack Frost, manager, announce that the Refrigeration Components Company of San Francisco has invented a refrigeration cleaner that is original in design and is completely automatic.

Its purpose is to eliminate all waste matters including scale, water, salt water, oil sludge and corrosion from coils, condensers, receivers and the entire system. It is capable of taking four gallons of oil per hour in an oil log system and keeping a 40-HP. Freon compressor in operation without any outside source of heat other than 5,000 watts of heat built within the unit itself.

Small and compact and made for use on any ship, it will operate on 110, 220 or 440 volts AC or DC. Two hours or less puts it in operation and three visibility windows permit inspection of the oil being drawn back as well as the cleanliness of the system.

Refrigeration Cleaner



Seaplay

(Continued from page 37)

guests the utmost amount of free space, so adding to their comfort when they wish to remain in their own quarters.

A watertight bulkhead separates the guests' quarters from the engine room, and on the other side of this wall the fuel tanks have been placed, so tending to muffle any noise from the engines when cruising. In the machinery compartment are installed two General Motors Model 6-71, six-cylinder Diesel engines of 200 b. hp. each at 2,000 rpm, driving twin propellers through a hydraulic clutch and reduction gears. At 12-knot cruising speed the consumption of fuel is exactly one gallon per nautical mile covered by the yacht. As the three fuel tanks hold a total of 900 gal., the cruising range is 900 nautical miles.

For auxiliary power and for starting the main engines there is a 10-kw. General Motors Diesel generator set and a storage battery of 217 ampere hours capacity. The domestic service water pump is driven by electric motor off the battery, making for silence when the yacht is anchored or moored. Electric light also is taken off the battery. Generally speaking the layout of the engine room is extremely simple, so its dimensions of 11-feet by 18-feet give ample working room. However, everything is so automatic that cruising is normally done without anyone in the engine room.

The galley forward of the engine room is quite large for an 80-footer, being 6-feet 6-inches by 17-feet, and is fitted with butane gas range, deep freeze, and refrigerator. The heating boiler for the domestic water supply, and the boiler for hot water heating of the yacht, are both located in the galley.

Ahead of the galley are two cabins on the port side, for the captain and steward respectively, and on the starboard side is the crew's mess room fitted with table and transom seats. Just ahead of this section there are three pipe berths and transom berths for the rest of the crew, which consists of chef and two sailors. There is an enclosed shower for the crew forward of the berths, and lockers for the linen and for the men, and a separate toilet room just aft of the chain locker. No less than 21-feet of the forward length of the hull by the forward breadth of the boat is given over to the captain and crew of four men, which should make them comfortable and contented.

Collaboration of Shipping Bureaus

Provisional arrangements have been made by the American Bureau of Shipping and Lloyd's Register of Shipping for a working agreement.

The purposes of the agreement are by collaboration to maintain the highest standards of classification and to approximate the rules and practices of the two Societies to each other; also, to make the best use of staff and avoid duplication. Arrangements will be made for facilitating dual classification. Shipowners will be free, as hitherto, to select whichever Society they prefer. It is hoped that the agreement will come into full operation early next year.

Society of Naval Architects And Marine Engineers Expands Again

The Society of Naval Architects and Marine Engineers is still growing. Since the first Section of the Society was organized in Philadelphia in 1941, seven Sections have been added: New York Metropolitan, New England, Chesapeake (Washington, Baltimore and Virginia aseas), Great Lakes, Northern California, with headquarters in San Francisco, Pacific Northwest, with headquarters in Seattle, and the most recent, the Southern California Section, with headquarters in Los Angeles, which was organized in March of this year. A report on the organization of the Southern California Section appeared in the April *Pacific Marine Review*.

Now in the process of formation is a group to be known as the Gulf Section, with headquarters in New Orleans. This will give the Society nine active Local Sections, all located in important maritime centers.

Institute of Navigation Elects New Officers

The Institute of Navigation announces the election of the following new officers for the academic year 1948-49: President, Rear Admiral G. G. McLintock, USMS, Superintendent of U. S. Merchant Marine Academy, Kings Point, Long Island, New York; Technical Advisor to the President, Dr. Paul Rosenberg; Executive Secretary, Professor Samuel Herrick, Chairman of Department of Astronomy, U.C.L.A., Los Angeles; Treasurer, Keith F. Smith; Vice Presidents, Major General Norris B. Harbold, USAF, Rear Admiral A. M. Pride, USN, Rear Admiral Telfair Knight, USMS, Rear Admiral Leo Otis Colbert, USCGS, Captain P. V. H. Weems, USN (Ret.), Colonel Albert G. Foote, USAF, Edward F. Flint, C. Towner French; Western Regional Vice-President, Captain M. E. Crossman, USMS; Central Regional Vice-President, Ludlow B. Hallman, Jr.; Eastern Regional Vice-President, Knox McIlwain; Canadian Regional Vice-President, Wing Commander Kenneth C. Maclure.

The following have been appointed as the chairmen of the National Committee of the Institute for the new academic year: Technical Development Committee for Air, Brigadier General Paul T. Cullen, USAF; Technical Development Committee for Surface, Commander Ross E. Freeman, USN; Committee on Standards for Surface, Commander Alton B. Moody, USNR; Committee on Standards for Air, Thomas Lee Burkett; Technical Development Committee for Upper Atmosphere and Interplanetary Navigation, Dr. Paul Rosenberg and Professor Samuel Herrick, co-chairmen; Committee on Mathematical Tables, Professor Charles H. Smiley; Education Committee, Commander J. King Gallaher, USMS.

The Institute of Navigation is a non-profit scientific and engineering society devoted to the advancement of navigation and its related sciences. The Institute sponsors the coordination of study and research in navigational problems throughout the United States in universities, military services, government agencies, and industrial laboratories.

Commodore Lee Entertains President of Brazil

Photograph courtesy of Moore-McCormack Lines.

The arrival recently of Moore-McCormack Lines' Good Neighbor liner Brazil in Rio de Janeiro on her first post-war voyage in her regular service to the East Coast of South America was the occasion for a luncheon aboard the reconverted luxury liner, at which Commodore Robert C. Lee, executive vice-president of the Line, played host to Eurico G. Dutra, President of Brazil, and his staff. In the above photograph, taken in the Brazil's Main Lounge, are President Dutra (left) and Commodore Lee.

Philippine Shipping Mushrooming

San Francisco's Port Manager, General Wylie, who visited the Philippine Islands last month with the Chamber of Commerce delegarion, reports that shipping activities in the Islands are growing at a tremendous rate. He groups the figures by foreign arrival and domestic arrival. The latter relates to Manila alone while the foreign trade figures cover the entire Republic.

Foreign trade shipping entering the Islands totals the following:

Year	No. of Vessels	Tonnage
1939	500	1,936,322
1940	730	2,755,519
1945	25	120,348
1946	218	908,234
1947	1,037	4,298,133
1948 (Jan. and Feb.)	315	(estimate) 1,285,376

It will be noted that in both vessels and tonnage the 1948 figures for two months, if extended for twelve months, would show a growth of about 60 per cent over 1947. 1947 had shown totals far in excess of 1939 and 1940.

In domestic shipping the figures are even more startling and show a volume in both ships and tonnage, especially in ships, that suggests great possibilities for those interested in small vessel construction and operation.

Year	No. of Vessels	Tonnage
1945	94	28,459
1946	976	237,848
1947	4,019	1,103,168

Kelite Introduces New Paint Remover

By inhibiting evaporation, improved Kelite Paint Lift penetrates paint more thoroughly and gets paint off faster. Extremely slow evaporation makes the new material especially effective for outdoor use.

Kelite Paint Lift is safe on all metals, including aluminum, iron, tin, magnesium etc. It contains no phenolic compounds, cannot blister skin—is non-toxic, non corrosive, and non-flammable.

Complete details and samples are available from the manufacturer, Kelite Products, Inc., Box 2917, Terminal Annex, Los Angeles 54, California.

Pringle Appointed By General Engineering and Dry Dock

General Engineering and Dry Dock Corporation recently announced the appointment of L. H. Pringle as plant manager of its San Francisco Plant.

June Meeting of San Francisco Propeller Club

Left to right: Harold Rethmeyer, Westinghouse; Carl McDowell, Pope & Talbot, Inc.; Lt. Caratto Monsolvi, Naval Reserve; Maitland Pennington, Pacific Transport Lines; E. W. Meiklereid, British Consul-General, San Francisco; Sir Godfrey Ince; Ed Harms, Pope & Talbot, Inc.; Sir Guildhaume Myrddin Evans; L. H. Hornsby, a director of public relations from England; M. J. Buckley, American President Lines; A. McD. Gordon, Counselor and Industrial Advisor from British Embassy, Washington, D. C.; Richard McLaren, Pacific Transport Lines; Gene Hoffman, American President Lines. Ince and Evans were the speakers, while Ed Harms presided.

Admiralty Decisions

By HAROLD S. DOBBS *of San Francisco Bar*

Shipowner and Repairman Freed of Liability

EVER SINCE the case of *Seas Shipping Co., Inc. v. Sieraki*, previously reported in this column, the courts have been flooded with a series of claims in the form of admiralty suits in which owners seek the benefit and protection of the rule announced in the Sieracki case.

The United States District Court for the Southern District of New York recently had before it a case entitled *Cioffi v. New Zealand Shipping Co., Ltd. and Bethlehem Steel Company*, respondents, in which Howland Mutual Lumber Co. (hereinafter referred to as "Howland") was impleaded as an additional respondent. Mr. Cioffi was employed by Howland at the time of his alleged injury. He brought suit against the respondent New Zealand Shipping Co. (hereinafter referred to as "New Zealand") and Bethlehem Steel Company (hereinafter referred to as "Bethlehem") for damages for personal injuries sustained as a result of alleged negligence on the part of the respondents.

On the 26th day of May in the year 1941, Cioffi, while descending to his work in No. 2 Hatch of the Steamship *Orari,* fell through the booby hatch on the lower 'tween deck to the bottom of the lower hold. He charged that the passage was obstructed by loose hatch covers and was inadequately lighted. The respondents denied each and all of his charges.

There is no question but that Cioffi fell and was injured. However, the question arises as to whether he is entitled to recover damages, and if so, from whom. The *Orari,* a reefer vessel, was owned and operated by New Zealand. At the time of the accident and for the month before the accident, she had been in Bethlehem Shipyard in Brooklyn where Bethlehem was installing new refrigerator compartments and new insulation necessitated by torpedo damage, and also degaussing work.

The *Orari* had three decks, main deck, upper 'tween deck and lower 'tween deck, besides the lower hold.

Cioffi, a ship's carpenter for some twenty-eight years, was an employee of Howland which, under a direct contract with New Zealand, was engaged in doing certain carpenter work on the *Orari*. On Cioffi's second day on the ship, May 26, 1941, he had been working in No. 3 lower hold when he stopped for supper at 5 p.m., but when he returned from supper at 7 p.m. he and several other Howland men were told by their foreman that they were to assist in the work in No. 2 lower hold. The others following, Cioffi started for the lower hold through the deck booby hatch down a ladder to the upper 'tween deck and by way of another booby hatch and ladder to the lower 'tween deck. Then, according to his testimony, as he was about to descend through the booby hatch down the ladder to the lower hold, he stumbled against a loose hatch cover, which he could not see because it was dark there, lost his balance, and fell to the bottom of the hold some twenty feet.

The court said that it was firmly convinced from the testimony introduced by the libelant that his fall was caused by having stumbled over a hatch cover or some obstacle in his path which he did not see because of the lack of sufficient light. The court reviewed the evidence with respect to the quantity of the light available in the booby hatch and concluded that there was no artificial light in the lower 'tween deck and that little natural light was available in the lower 'tween deck.

New Zealand had moved the *Orari* to Bethlehem's shipyard for certain repairs by Bethlehem. However, the work that Howland, libelant's employer, was engaged in was under a contract with New Zealand—not Bethlehem—so that, at least, there was no contractual relation between Bethlehem and Howland's employees which imposed upon Bethlehem the duty of exercising special care towards them.

New Zealand maintained aboard the *Orari* while in Bethlehem' yard nearly a full crew, and the ship's master or mates were alternately in charge and control of her generally. In an effort to show that she was under the control of Bethlehem, New Zealand referred to the fact that members of the crew could not enter the shipyard without permission of Bethlehem's gatekeeper, but this permission was merely to enter the yard. Both Bethlehem's and Howland's employees had to have permission from the member of the ship's crew on watch before going aboard the ship.

Although there was come dispute as to just what part of No. 2 cargo space Bethlehem's men worked, the evidence is that they had finished their work in No. 2 at the latest on the morning of May 24—more than two days before the accident. Therefore, unless Bethlehem's men created or left a dangerous condition and this condition existed up to the time of the accident, there seems to be no ground for holding Bethlehem liable. There is no evidence that Bethlehem's employees created or left No. 2 cargo space in the dangerous condition which existed at the time of the accident.

As I have already said, the doctrine that a shipowner is under obligation to provide seamen with a seaworthy ship has been extended to benefit that class of workers known as "contract stevedores" who are injured while working aboard a vessel. (*Seas Shipping Co.*) However, there is considerable doubt from the cases decided since that time, as to whether this doctrine of seaworthiness extends to contract repairmen as distinguished from contract stevedores. In a recent New York case, the court said that the shipowner owes a "business invitee" a reasonably safe place to work. I venture no opinion as to whether the classification is truly descriptive of the libelant in this case.

There was testimony from the ship's third officer that

(Please turn to page 92)

Ocean-Going Tug "Relief"

Los Angeles Bilge Club. The Club members called this the bilge deck of the Relief as they boarded for a tour of the harbor.

Several members of The Bilge Club of Los Angeles Harbor were recently guests of the San Pedro Tugboat Company for a trip aboard the firm's latest addition to its fleet—the ocean-going tug *Relief*, a 126 footer, powered with 1200 hp Enterprise diesel engine. Captain William McGillivray, Manager of the San Pedro Tugboat Company, and Duke Decker, Operating Manager, were hosts for the trip around the Los Angeles Harbor area.

Recently the *Relief* was engaged to tow two LSTs from San Francisco to Orange, Texas, for the Humble Oil & Refining Company. After this tow she returns to her base at San Pedro.

The Relief at its San Pedro pier prior to the intercoastal tow.

Foster Wheeler Appointments

Foster Wheeler Corporation has announced three changes in its sales staff.

H. B. Wallace, Jr. has been appointed manager of steam sales for the corporation. He had been manager of the New England territory in Boston since his return from the armed service.

A. F. Downham has been appointed manager of the New England territory succeeding Mr. Wallace. Mr. Downham was formerly in the sales department of the Pittsburgh office.

W. H. Hardie has become associated with the New York Sales office and will concentrate on the sales of steam generators, pulverizers, superheaters and related products.

H. B. Wallace

A. F. Downham

W. H. Hardie

How to go Down a Ladder

Everybody knows how to go down a ladder. Or does everyone? More than 10% of the seamen injured by falls last year fell from or on permanent sloping ladders, and most of them fell while coming down.

One sure way to risk your neck is to go up or down with both hands full of gear or stuffed into your pockets. Another way is to pick up your feet and slide down the rails. Those two practices are just asking for trouble, but how about the man who keeps his feet on the treads and his hands on the rails?

LUBBERLY

When a man goes down a ladder facing directly forward with both his hands alongside his body as in this picture, he can stumble forward or slip down quite a distance before his muscles tighten up enough to hold him. In falling forward a man's grip on the rail can be very easily broken.

SEAMANLIKE

By turning the body somewhat to one side and keeping one hand above the body and one below, there is much less chance of falling forward. The upper arm is nearly straight and ready to take the strain as soon as a man starts to fall, and the hand is in a good position to keep a firm grip on the rail.

Aquatic Lady

Due to visit the Olympic Games in London is Mrs. Elsa Cordes, wife of John Cordes of Cordes Bros., San Francisco. Mrs. Cordes is a former swimming champion and represented Sweden in the 1912 Olympic Games as Elsa Anderson. At present, she is visiting friends and relatives in Sweden. Her plans are to return to the United States via France, Finland and Sweden to New York. Mr. Cordes plans to meet her there in October.

Admiralty Decisions

(Continued from page 86)

he went down into the lower 'tween deck immediately after the accident and that there was no artificial light there, but that as he was returning to get a flashlight, he saw a portable electric light equipment on the main deck near the booby hatch.

In view of the uncontradicted credible testimony that electrical equipment was lying on the deck near the booby hatch ready for use and available to libelant or his foreman, the vessel owner ought not to be held liable for any injuries sustained by Howland's employees because of their or libelant's failure to use the equipment available for lighting the 'tween decks.

If the vessel-owner was responsible for the obstruction and the obstruction was a concurrent cause of libelant's fall, the owner would be subject to liability, although it may well be that had there been sufficient light, libelant would have seen the obstruction and avoided it. But there is no evidence that the ship's officers or crew had been working in No. 2 hold that day, nor that they caused or had knowledge of any obstruction in the pathway to the booby hatch on the lower 'tween deck. (When a shipowner surrenders control of part of his ship to an independent contractor, his duty as to the part surrendered extends only up to the time the independent contractor assumes control.) Howland's employees were working in the lower hold of No. 2 during the day; they passed up and down through the same booby hatches without reporting any difficulty or obstruction.

When Howland's foreman ordered the libelant to go down to the lower hold to work he, the foreman, knew or should have known that the lower 'tween deck and lower hold would be dark and that artificial light would be necessary nor only to enable his men to find their way down but also to carry on the work in the lower hold. It was the duty of the foreman to have made use of the electric light equipment which was lying on deck near the booby hatch. The vessel-owner was not responsible if Howland's foreman failed to use the equipment which was at hand.

The court said that it could not give libelant a direct judgment against Howland, his employer, because his exclusive remedy would be by way of compensation under the United States Longshoremen's and Harbor Workers' Act.

Decrees were entered dismissing the libels and the impleading petition.

Stop Rust... and Save with RUST-OLEUM

Rust-Oleum slashes maintenance costs 3 ways. It's enduring protective coating seals metal against rust-forming elements. Nothing equals it as a positive, low-cost rust preventive!

1. IT CUTS PREPARATION TIME! No sandblasting or chemical cleaners are necessary. Quick wirebrushing removes paint scale, blisters, dirt, etc.

2. IT GOES ON FASTER! Rust-Oleum saves 25% of the time ordinarily required for application and covers 30% more area than ordinary materials.

3. IT PROTECTS LONGER! Rust-Oleum outlasts ordinary paint two to ten times, depending upon conditions under which it is used. This means maximum savings on every application.

FREE: New Rust-Oleum catalog showing colors and applications. Write us or your supply distributor *today.*

JAMES R. BOREN BOX 134 TEMPLE CITY, CAL.

GRACE LINE
"SANTA FLEET"

SERVES LATIN AMERICAS

S. S. SANTA ADELA
S. S. SANTA JUANA
S. S. SANTA FLAVIA
S. S. SANTA LEONOR

These C-2 fast freight vessels, equipped with refrigerator space, and limited passenger accommodations, together with modern chartered tonnage, supply frequent service between —

BRITISH COLUMBIA **WASHINGTON**
OREGON **CALIFORNIA**

and

Mexico Central America Panama Colombia
Ecuador Peru Bolivia Chile

SEATTLE
White Building
SEneca 4300

SAN FRANCISCO
2 Pine Street
SUtter 1-3800

LOS ANGELES
523 W. Sixth
MIchigan 7811

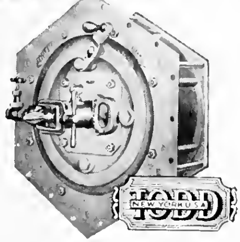
VANCOUVER
991 Hastings St., W.
PAcific 7271

PORTLAND
738 Mead Bldg.
CApitol 1013

Reflecting 35 YEARS of
ENGINEERING PROGRESS

TODD OIL BURNERS

• Today, the boilers of thousands of merchant and naval ships of many nations are fired by Todd Oil Burners . . . fitting recognition of successive advances that have made Todd the standard for combustion equipment.



COMBUSTION EQUIPMENT DIVISION
TODD SHIPYARDS CORPORATION
81-16 45th Avenue, Elmhurst, Queens, N. Y.

NEW YORK • BROOKLYN • ROCHESTER • HOBOKEN • NEWARK
PHILADELPHIA • CHARLESTON, S. C. • CHICAGO • BOSTON • SPRINGFIELD, MASS.
BALTIMORE • WASHINGTON • DETROIT • GRAND RAPIDS • TAMPA • GALVESTON
NEW ORLEANS • MOBILE • LOS ANGELES • SAN FRANCISCO • SEATTLE
TORONTO • MONTREAL • BARRANQUILLA • BUENOS AIRES • LONDON

FUEL AND WATER LEVEL INDICATION
at a Glance

WITH A LIQUIDOMETER DIAL TYPE TANK GAUGE

Direct Reading • Remote Reading

HYDRAULIC, HYDROSTATIC OR ELECTRIC TRANSMISSION

•

For complete information, prices and delivery dates, write or phone

THE LIQUIDOMETER CORP.
Marine Division

STillwell 4-1440
41-52 37th ST., LONG ISLAND CITY 1, N. Y.

Book Review

SMALL BOAT ENGINE MANUAL, by C. Morgan Jones, published by Cornell Maritime Press. Price $4.00; 268 pages.

This manual is a practical and complete guide to small boat engine selection, installation, operation and maintenance. The text is concise and there are many illustrations of engines, engine parts, auxiliaries and equipment. The book tells how to recognize symptoms, make diagnosis and repairs on all types of gasoline and Diesel engines commonly used in pleasure craft and small fishing boats; and problems of the small boat operator are answered in non-technical language. To facilitate the use of the book, a complete index is provided.

Low Temperature Air Conditioning

(Continued from page 45)

ment temperature and air supply is of necessity large to reduce the compartment temperature as quickly as possible. When storage conditions are reached, however, this differential must be adjusted to conform to the conditions initially established for the particular cargo.

By means of the psychrometric chart this importance can be explained readily.

Referring to Fig. No. 2, point "A" represents 32°F. and 85% relative humidity, a given condition established for citrus fruits. The dewpoint of the air at this condition is 28½°F. (point "B").

Assuming that the air leaving the fan is saturated at 28½°F, the air quantity is balanced properly for the load, and disregarding a possible rise in dewpoint due to moisture absorption from the product, a 3½° difference between air entering the coils and leaving the fan would automatically establish the room temperature to 32° and 85%.

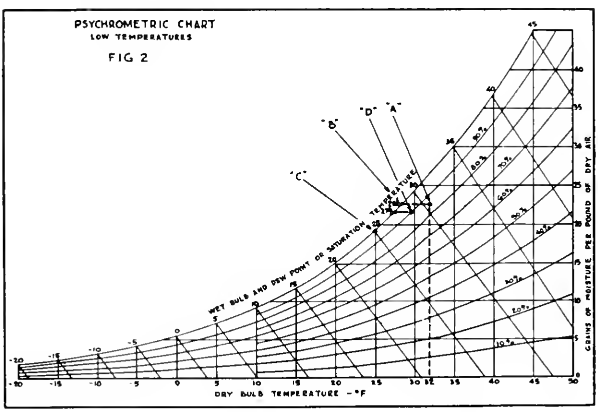
From Fig. No. 2 it may be readily seen that reduction of the air temperature leaving the fan to a dewpoint of 25°F, point "C", would have the following results:

a. If air quantity is reduced to maintain 32°F, the humidity would be less than 75% and not 85% as originally specified. If humidity in the compartment shows 85%, it is an indication that moisture from the product has been absorbed by the air with a consequent drying of the product.

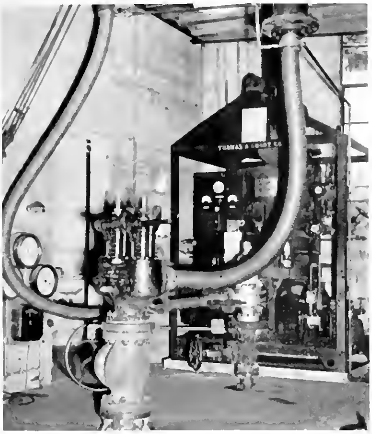
b. If air quantity is not reduced but humidity is maintained at 85%, the dry bulb temperature would automatically be lowered to 28½°F instead of 32°F. Result would be freezer burn on the product.

In both (a) and (b), for simplicity reasons, lowering of the apparatus dewpoint to offset moisture gain in the compartment due to latent heat load has not been taken into account.

From this analysis it is quite evident that, to maintain proper temperature and humidity conditions in a compartment the operating engineer must adjust the air leaving temperature to conform to the design requirement and adjust air quantity to suit. Adjusting air quantity without regard to leaving air temperature may have damaging effects on the product.



PSYCHROMETRIC CHART
LOW TEMPERATURES
FIG 2



Have Your Safety Valves

OVERHAULED, TESTED AND SET WITH STEAM FOR —

ANY PRESSURE
ANY TEMPERATURE
ANY BLOW-DOWN

at the

Thomas A. Short Company

245 Fremont Street
San Francisco — YUkon 6-0294

MOORE-McCORMACK *Lines*

AMERICAN REPUBLICS LINE

Freight and Passenger Service between the East Coast of United States and the countries of

BRAZIL · URUGUAY · ARGENTINA

PACIFIC REPUBLICS LINE

Freight and Passenger Service between the West Coast of United States and the countries of

BRAZIL · URUGUAY · ARGENTINA

AMERICAN SCANTIC LINE

Freight and Passenger Service between the East Coast of United States and the countries of

NORWAY	DENMARK	SWEDEN
POLAND	FINLAND	RUSSIA

From Pearl Harbor to V-J Day, Moore-McCormack Lines operated more than 150 ships, lost 11 vessels, transported 754,239 troops and carried 34,410,111 tons of war cargo. To discharge such responsibilities in time of crisis, America's Merchant Marine must be kept strong in peace —as in war.

For complete information apply

MOORE - McCORMACK

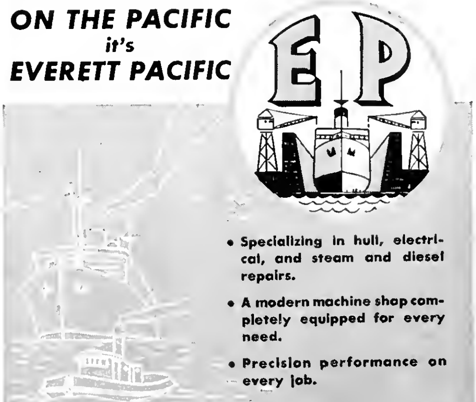
140 CALIFORNIA STREET
San Francisco 11, Calif.
530 WEST SIXTH STREET
Los Angeles 14, Calif.
DEXTER-HORTON BUILDING
Seattle 4, Washington
BOARD OF TRADE BUILDING
Portland 4, Oregon
744 HASTINGS ST. WEST
Vancouver, B. C.

Offices in Principal Cities of the World

CONDENSER SERVICE & ENGINEERING CO., INC.

TERCO PRODUCTS CO. — *West Coast Representatives*
941 Howard Street, San Francisco 3, Calif.

ON THE PACIFIC
it's
EVERETT PACIFIC



- **Specializing in hull, electrical, and steam and diesel repairs.**
- **A modern machine shop completely equipped for every need.**
- **Precision performance on every job.**

EVERETT PACIFIC

SHIPBUILDING AND DRY DOCK COMPANY

EVERETT, WASHINGTON

SHIP REPAIR & CONVERSION ★ ***10,500 TON DRY DOCK***

Nautical Scientist Openings

An examination has been announced by the U. S. Civil Service Commission for filling Nautical positions in Washington, D. C., and throughout the United States, at salaries ranging from $3,727 to $6,235 a year. The majority of the positions are in the Hydrographic Office of the Department of the Navy; vacancies will also be filled in the Coast and Geodetic Survey, Department of Commerce, and in other Federal agencies.

No written test is required. To qualify, all applicants (a) must be graduates of the U. S. Naval, Coast Guard, or National Maritime Academy or of a state maritime academy, and must have had appropriate sea experience; *or* (b) must have had a combination of appropriate sea experience and experience in the field of nautical science. Education at a national or state maritime academy may be substituted for the nautical science experience. For the higher grade positions, applicants must have had additional experience in the field of nautical science. The examination announcement contains detailed information about these requirements.

Interested persons may obtain information and application forms from the U. S. Civil Service Commission, Washington 25, D. C., from most first- and second-class post offices, or from Civil Service regional offices. Applications will be accepted by the Commission's Washington office until December 31, 1948.

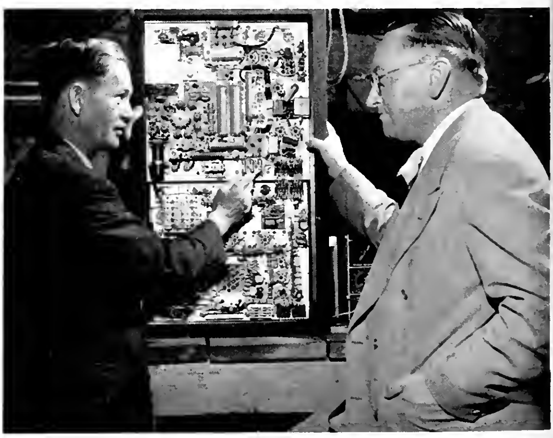
Republic Electric Announces Marine Radio Department

Wen Garrett, president of Republic Electric Company, San Francisco, has announced a newly organized marine radio department for servicing and installation of ship radio equipment. This new division is in charge of William Steel, formerly with Matson Navigation Company and United Engineering Company; and assistants are Richard Dickson and Walter Amark.

Republic Electric's radio department will maintain day and night service and will also take care of annual inspection requirements of the Federal Communications Commission.

Republic Electric Company's control console of the entertainment public address system aboard S. S. Lurline.

William Steele, manager of new marine radio service department of Republic Electric (left) and Wen Garrett, president of Republic Electric.



KEEP POSTED

New Equipment and Literature for Yard, Ship and Dock

Drum Pump For Volatile Liquids Eliminates Evaporation

The General Scientific Equipment Company of Philadelphia recently announced a self-priming drum Pump for alcohols, paint thinners, light oils and other volatile liquids, equipped with a positive shut-off valve that is absolute protection against evaporation losses. Its maximum capacity is 15 gallons per minute.

Drum Pump

The No. 750 pump has no pistons, rings or leathers; no rotating parts to stick or wear. The special diaphragm is a heavy cord-fabric vulcanized between synthetics. It does not dry out, swell up, rust or corrode and is unaffected by petroleum products, alcohol and most other fluids.

A handy fill-spout makes it easy to fill measuring cans and containers. All waste is prevented by an automatic drain back which completely drains hose and pump when handle is lifted. A locking link, near the middle of the handle, can be used to prevent use of pump by unauthorized persons.

Sumco Products Issues Handbook

The Sumco Products Handbook, issued by Sumco Products, Inc., Brooklyn, manufacturers of chemical cleaners for marine use, constitutes a simple, authoritative and attractive approach to shipboard cleaning problems. In clear and understandable terms, this comprehensive handbook deals with the removal chemically of sludge, fire scale and water scale, and general ship cleaning.

New and improved methods of shipboard cleaning are described in this handbook, and the most frequently used conversion tables, pumping temperature charts and pipe dimensions are included.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW
500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

....Issue. Page No..............

....

....

....

(Identify by name of manufacturer and catalog)

NAME..

BUSINESS..

ADDRESS...

Designer Had a Reason

(Continued from page 48)

not applicable and can not be produced at a profit, he has failed in spite of the fact that he may have the most perfect machine that has ever been conceived. Third, integrity is an important characteristic. You may find it possible to accept a stupid, dull or lazy individual, but never the untrustworthy. Fourth, you must have loyalty, it having been acknowledged that loyalty is a two way road and that his loyalty, is to be returned in equal part to match his contribution. Fifth, it is important that he have soundness of judgment. It is acknowledged that soundness of judgment is developed by experience. He must not be erratic. He must have no prejudices. He must be modest and have a good amount of common sense.

In conclusion, we can say that diesel design is not an exact science any more than most mechanical design can be classified as an exact science. The designer can be considered as a craftsman of high order and one who, through experience, judgment and experimental data, is able to design a product from information that is woven into rational rules and applied in a consistent manner. The application and use of such information at his disposal should indicate conclusively that for what he has done the designer had a reason.

New Wilmington Quarters for Frank Groves Co.

Frank Groves, president of the Frank Groves Company, announces that effective September 1 the firm's Los Angeles Harbor offices will be open in new and larger space at 520 No. Avalon Boulevard, Wilmington, California.

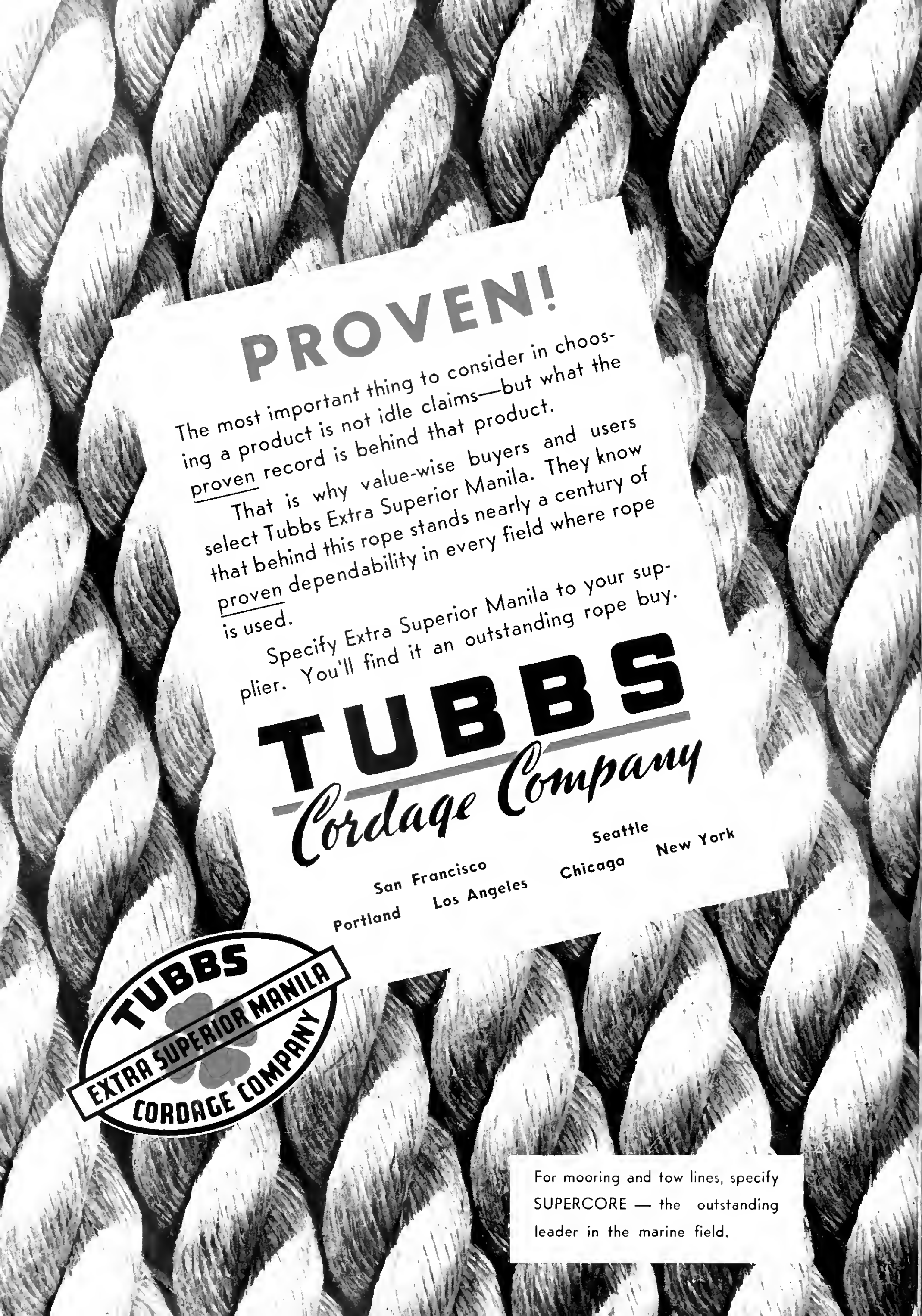
Stevens Institute Begins $100,000 Research Project for Navy

The Experimental Towing Tank Laboratory of Stevens Institute of Technology will begin work immediately on a new research project under the auspices of the Office of Naval Research for the Bureau of Ships, Dr. Kenneth S. M. Davidson, director of the laboratory, announces.

The project is on control and maneuverability of free bodies and is a continuation of work on basic hydrodynamic problems which was begun during World War II for the Navy. Models of ships and of submerged bodies will be used in the tests.

Pacific
MARINE
REVIEW

SEPTEMBER 1948



PROVEN!
The most important thing to consider in choosing a product is not idle claims—but what the proven record is behind that product.
That is why value-wise buyers and users select Tubbs Extra Superior Manila. They know that behind this rope stands nearly a century of proven dependability in every field where rope is used.
Specify Extra Superior Manila to your supplier. You'll find it an outstanding rope buy.
TUBBS
Cordage Company
San Francisco
Seattle
New York
Portland
Los Angeles
Chicago
TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY
For mooring and tow lines, specify SUPERCORE — the outstanding leader in the marine field.

Pacific
MARINE
REVIEW

scription rates:

year, $2.00; two years, ; three years, $5.00; for- $1.00 additional per year; copies, 25c.

TABLE OF CONTENTS - - - - - - SEPTEMBER, 1948

PUBLISHED AT 500 SANSOME STREET • SAN FRANCISCO 11, CALIFORNIA

LUXURY aboard the Lurline . .

. . Safeguarded with J-M Marine Materials

LIKE practically every major vessel built or rebuilt in the last ten years, the newly reconstructed Matson Line flagship Lurline also has her luxurious interior protected by the safety of Johns-Manville Marine Materials. Panelling throughout the ship is J-M Marinite and Marine Sheathing. And, J-M Acoustical Units keep dining rooms and public spaces quiet—free from disturbing noises.

Marinite, the modern fireproof joiner panel, is an asbestos product requiring only a minimum of upkeep. It is light in weight, vermin-proof and has low heat and sound conductivity. It is furnished ready for painting or with almost any type of finish, such as fine wood veneers, metal or hard abuse-resisting Marine Veneer. Waxing the latter finish eliminates the need for paint.

Johns-Manville Marine Materials are described in brochure TR-55A. Write Johns-Manville, Box 290, New York 16, New York, for your copy.

Johns-Manville

MARINITE

& MARINE SHEATHING

HOMEWARD BOUND

FOR over a quarter of a century, from 1918 to 1946, there appeared on this page of the *Pacific Marine Review* the constructive messages on maritime industry problems by Alexander Dickie. He passed away August 17, a well-loved citizen and an authoritative editor. Born in San Francisco in 1877 and graduated from the University of California, class of 1898, Mr. Dickie spent an apprenticeship in the shops of the Union Iron Works (now Bethlehem Steel's Shipbuilding Division). His father, George W. Dickie was general manager of the Union Iron Works and his uncle, James Dickie, was manager of the shipbuilding division. Always interested in ships and in everything relating to ships, he was the author of many an article of historical importance on the subject, and collaborated on many books. He was a member of engineering and historical societies, and of the Engineers Club of San Francisco, for the former of whom, during the years, he performed important tasks, not the least of which was the checking of University curricula in engineering courses.

ALEXANDER J. DICKIE

A long-time Elder in the First Presbyterian Church of Berkeley, he needed no "lights along the shore" to guide his way. He was possessed of an inner light that was entirely ample for his needs.

To Mrs. Dickie, the sons and grandchildren, all sympathy. The pillar of Strength is gone, but the pillar of Faith remains.

"Anchored fast by the heavenly shore
With the storms all past forevermore."

Mountain Climbing And West Coast Shipyards

(Editorial)

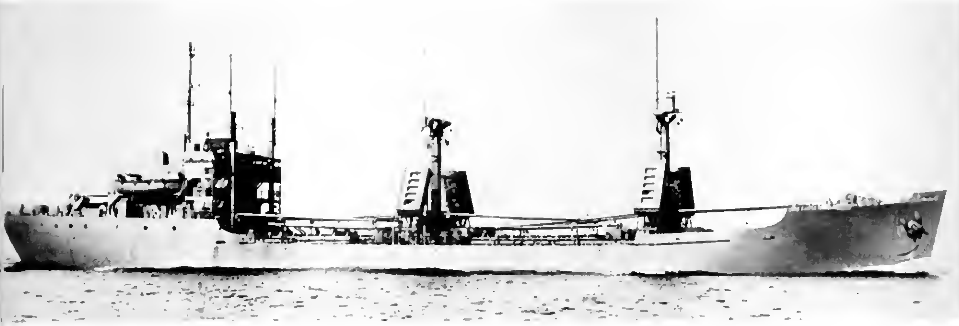
MAYBE we are too good at climbing. We get to the top and gaze around, and maybe sit down, and prepare to boast of the accomplishment, for the hard part seems to be over. Many business firms, civic groups and individuals coast along on past records and neglect the present and future.

There have been some great achievements in shipbuilding in the West, dating back into the last century. Both private yards and Navy yards have built fine ships and developed some fine marine equipment, and during the last war Pacific Coast yards far outstripped the rest of the country in the number of cargo ships built. In these days when almost any ship contract is newsworthy, it is hard to realize that the Pacific Coast produced 502 ships *more than* the Atlantic Coast. The figures were 145 for the Great Lakes area, 987 for Gulf Coast, 1,790 for Atlantic Coast, and 2,292 for Pacific Coast. Quite a record! We boasted about it then, and we still boast, but more faintly. We haven't done much about it lately.

There are many groups in this Western land that specialize in enthusiasm, but in the clamor for new industries they are neglecting some old ones—old ones that are important to the welfare of the West and the Nation. Shipbuilding is one of these, and the shipbuilding industry needs the support of City and State Administrations, Chambers of Commerce, civic clubs, labor and the general public.

The importance of keeping West Coast shipyards active in building operations is well known to the Defense departments, and they do their share in distributing the repair and conversion work, and the Navy is putting some construction work in its West Coast yards, but construction forces in private yards also must be kept intact. The present great splurge of tanker construction may overflow the eastern yards and reach the West, but the elements of cost—labor and availability of materials—keeps the big long-time jobs in the East. The 6 per cent differential in favor of Pacific Coast yards, which the Maritime Commission must take into account where the operator has its head office on the Pacific Coast and the vessel is to be used in foreign trade from Pacific Coast ports, and which many think of as protecting western interests has but little present importance. One leading shipbuilder suggests that the actual difference in costs is at least 13 per cent.

At a recent convention of port authorities a plan was set in motion whereby the force of public opinion would be brought to bear for the prevention of port tie-ups. A similar plan should be devised in behalf of shipbuilding. It is time that western Mayors and others in high positions were made to realize that shipbuilding, ship operating, insurance, finance, and world trade, on which their cities live, need great and continuing effort on their part. Obstacles to shipbuilding and shipping in the West should be removed. Instead of just glorying in the past and hoping for the future of their ports, they should be marshalling public opinion in behalf of a continuing climb. When the going seems easy it's well to make sure we're not going downhill.



C1-MAV 1 before conversion.

Army's Diesel Transports For Inter-Island Service

By GEORGE H. HARLAN

N JUNE of 1948, the Army Transportation Corps at the Seattle Port of Embarkation called for bids from umerous Pacific Coast shipyards for the conversion of vo diesel driven freight vessels of the coastal type to nall Army Transports for inter-island passenger and eight service. The successful bidder for the job was loore Drydock Company of Oakland, and at the present me that firm is busily engaged in making all necessary emovals preparatory to making the re-arrangements reuired by the conversion. The plans and specifications for ne work were prepared in New York and Washington y the design section of the Office of the Chief of ransportation.

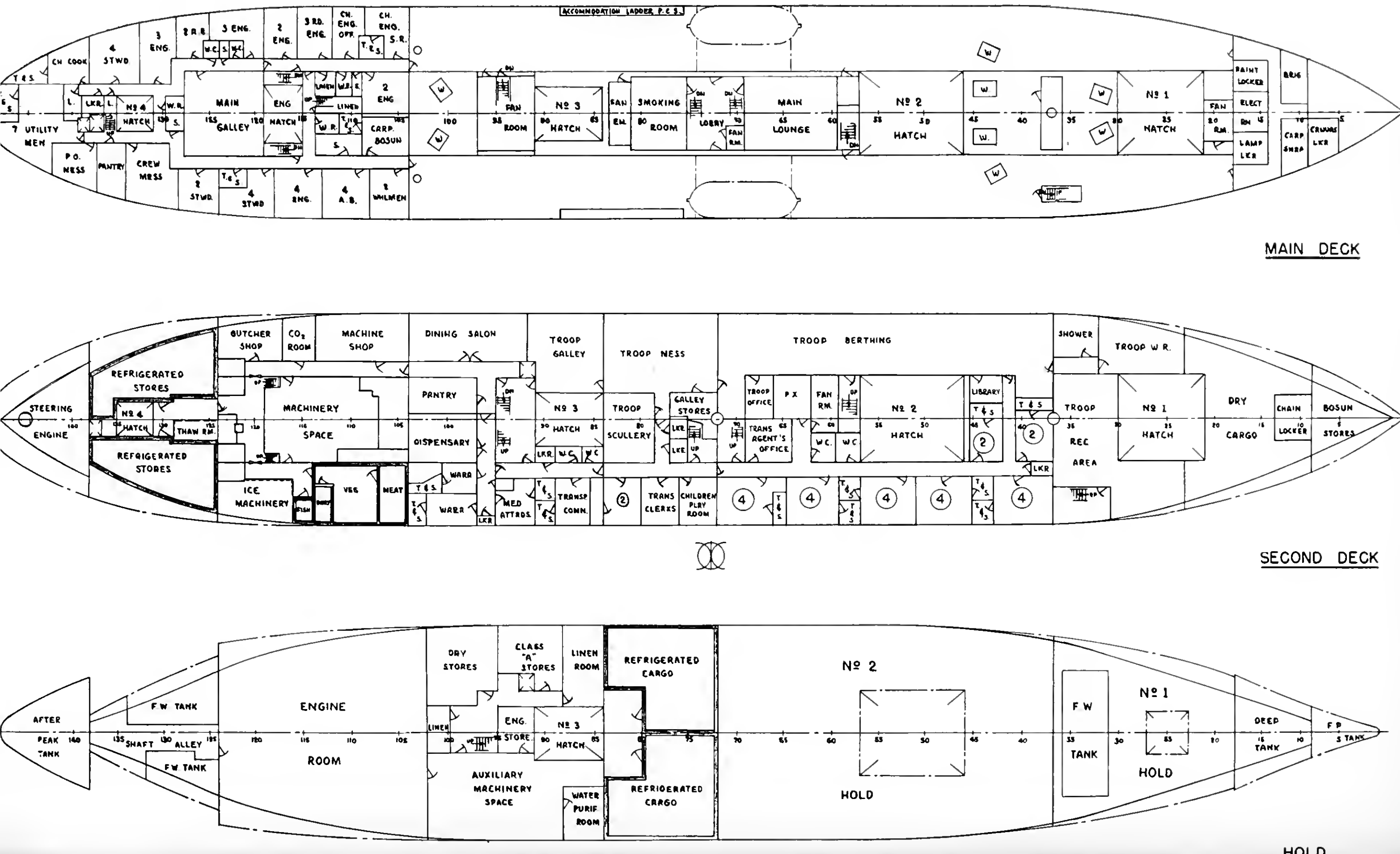
The two vessels, the *Check Knot* and the *Acorn Knot,* re typical *C1MAV1* ships of the U. S. Maritime Comnission design, and both are powered with Busch-Sultzer iesel engines which develop 1700 horsepower each. The *lcorn Knot* was built by the Walter Butler Corporation f Duluth, Minnesota, in October 1945. She was origially assigned the name *Alexander R. Nininger, Jr.* but vas later rechristened, her present name being substituted o remain in keeping with the christening scheme of the alance of the vessels of her class built by the Maritime Commission and operated by the War Shipping Adminisration. The *Check Knot* was built by the Southeastern hipbuilding Company of Savannah, Georgia, receiving bottle of champagne across her bows in June of 1945.

The *Acorn Knot,* at the beginning of the conversion, was withdrawn from regular Army freight duty and assigned to the conversion program, and the *Check Knot,* having been previously laid up by the Maritime Commission, had to be re-commissioned and returned to active service before being made available for her assignment.

Particulars of the *Check Knot* and the *Acorn Knot:*

Length Over All	338′-8⅜″
Length Between Perpendiculars	321′-4″
Breadth, Moulded	50′-0″
Depth, Moulded	29′-0″
Gross Tonnage (Prior to Conversion)	3,805

The present conversion of the two vessels is somewhat extensive, and goes beyond accomplishment of work which is necessary to comply with the rules and regulations of the United States Coast Guard, Marine Inspection Service, and the American Bureau of Shipping. The vessels will be, upon completion, equipped to carry not only Army enlisted and officer personnel, but dependent women and children as well. Every effort is being made to render the ships comfortable from the passengers' standpoint with substantial furnishings which will be useful, convenient, and artistic, while at the same time safe under all conditions for the passengers' use. The vessels will be comparable in quality with their larger sisters in the Army's fleet, the *General Simon B. Buckner,* and the *David C. Shanks,* and will be the smallest fully



Deck plans for the converted C-1 transports.

converted transports afloat.

The *C1MAV1 type* vessel as designed by the Maritime Commission is not equipped to carry passengers. Therefore, in order to accommodate passengers in suitable quarters, these vessels must, of course, undergo extensive alteration as to arrangement, ballasting, and addition of mechanical features.

The conversion only slightly changes the outward appearance of the vessels. Some additional housing has been added to the main deck, and the mast between hatches numbers two and three has been removed, together with all winches, booms, and associated fittings. Because the cargo carrying spaces have been materially reduced, and the space assigned for other uses, the need for the present complement of cargo gear no longer exists. Hence only the foremast, with booms serving hatches numbers one and two, and the kingposts located just forward of the bridge, with booms serving hatch number three, remain.

No alterations have been made to the crew quarters located in the deck house at the after end of the ship, with the exception of the removal of the officers' dining salon from the poop deck to the second deck. The area from which this room has been removed will be altered to serve as quarters for additional permanent crew members who have been added to the vessel's complement to handle the passengers which will be carried.

The main deck, open to the weather between the forecastle and the poop, a distance of approximately two hundred feet, will be wood covered over its entire length in the areas outboard of the raised longitudinal deck girders, and will serve as a promenade for passengers. Recessed wells in the outboard railing will be provided opposite number three hatch, port and starboard, to provide for the two new aluminum accommodation ladders. Two new additional sixty-six person lifeboats in gravity davits will be installed on either side of the main deck to take care of the increase in number of persons carried on board as per U. S. Coast Guard requirements for passenger vessels.

In way of the mast removal between hatches numbers two and three, a deck house will be built which will house a stair lobby, a smoking room, and the main lounge. The area between the hatches will be materially increased in length due to the cutting in size of both of the hatches. These new public rooms, placed in an advantageous location on a spacious deck, will be the nucleus of a pleasant recreation center for the passengers. Numerous fan rooms and booby hatches dot the main deck, the former housing the additional ventilation units for passenger quarters and public rooms, and the latter providing ready access to the life saving equipment on the open deck.

The second deck, which is in a comparable location with the 'tween deck of a freighter, will be completely revamped to provide for accommodations for twenty-six cabin class passengers and eighty-one troops. Compartment number one will be divided, and forward and

(Please turn to page 96)

General Lester Takes Over at S. F. Port of Embarkation

Major General James A. Lester, former Chief of Staff, Eighth Army, was recently assigned to command of the San Francisco Port of Embarkation, succeeding Brigadier General Neal H. McKay, who has applied for retirement because of ill health.

A distinguished combat officer of both World Wars, General Lester was Assistant Commandent of the Field Artillery School at Fort Sill, Oklahoma, at the outbreak of World War II. In March 1942 he became Commanding General of Division Artillery of the 24th Infantry Division and joined the Division in Hawaii as a Brigadier General, remaining in this command until the end of the Hollandia Operation in Dutch New Guinea. He was then assigned as Commanding General, XIV Corps Artillery and saw action in the Solomon Islands (Bougainville) and in the liberation of Luzon. He was promoted to Major General in March of 1945.

From June 1945 until December 1945 General Lester served as Commanding General of the Philippines Constabulary and was awarded the Distinguished Service Star of the Philippines by the Commonwealth of the Philippines. He headed the 24th Infantry Division from December 1945 until January 1948 when he was named Chief of Staff, Eighth Army.

Major General James A. Lester

Colonel Fenton Jacobs, who has been in command of the San Francisco Port of Embarkation since General McKay became ill last May, has been promoted to Brigadier General and continues as Deputy Commander of the Port.

Liberty Propeller Shaft Solutions

THE February *Pacific Marine Review* contained an article dealing with the corrective measures devised by the American Bureau of Shipping for the faults developing in Liberty ship rudders. In other issues there have appeared from time to time references to welded plate faults. The American Bureau has now come up with suggested solutions to the cracking of propeller shafts in Libertys and the Todd Shipyard at San Pedro has furnished a fine set of photographs of an installation conforming to the American Bureau's suggestions.

The record number of failures at sea of tailshafts on Liberty vessels is quite abnormal and is a matter of considerable concern to all interested parties. During a 12-month period, March 1947 to March 1948 1,017 shafts were examined and of this number 224 or 22 percent had to be renewed for various reasons. The American Bureau of Shipping has made a detailed study of these failures and states that the natural frequency of the propelling system has been determined on the Liberty type ships. It has also been found that the vibratory torsional stresses set up at the critical revolutions for the third order harmonic are of sufficient magnitude to contribute to the failure of the propeller shaft if the engine is operated for a sufficient length of time at or near this speed. In addition to Bureau tests the Burmeister & Wain Co. has made available the results of several other tests and these indicate that the third order peak will occur on different ships at slightly varying revolutions but for vessels with engines located amidship and fitted with the original built-up crankshafts and solid bronze propellors this peak will occur within the range of 74 to 78 r. p. m.

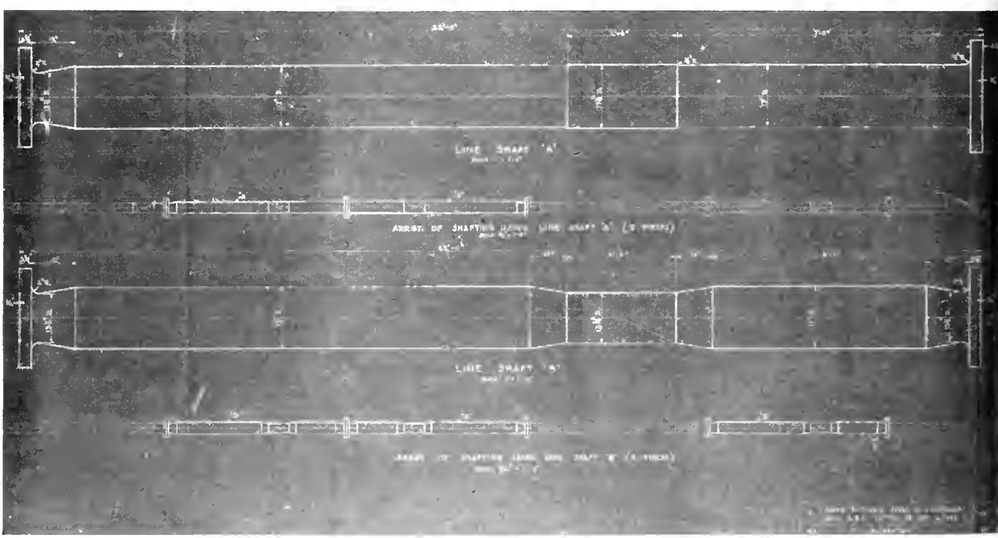
The failures occur at the large end of the propeller shaft cone which is the point of maximum stress concentration and the Bureau has investigated a number of methods for reducing the stresses. Some of these proposals have been discarded as being impracticable for various reasons but should any of the owners develop methods for overcoming this condition which they feel will be more advantageous than the methods suggested the Bureau will be pleased to consider such proposals and make available to the owners such technical data as may be of assistance in their development.

As a result of the study the Bureau recommends that steps be taken as outlined below.

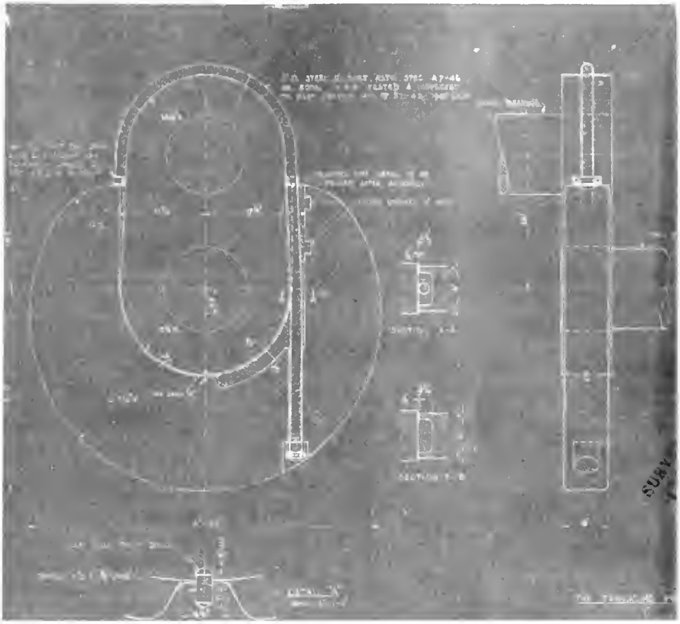
(1) *Sealing arrangement.*—Existing arrangements for sealing the propeller shaft have not proved entirely

Proposed line shaft. If this solution is tried and if line shaft A is used, two sections of existing line shaft will be removed, two new line shaft bearings will be installed, the design of the new bearing may require foundation changes, and the allowable speed will be 72 R.P.M.

If line shaft B is used, three existing sections will be removed, no change in bearings will be required, and the allowable speed will be 74 R.P.M.



Crankshaft Counterweight. This solution requires that a counterweight be fitted to each of the six webs of the main engine crankshaft. The weight of each counterweight is about 3,600 lbs. of cast iron and 600 lbs. of type metal.



satisfactory. If sea water has access to the steel shaft the endurance limit of the material is appreciably reduced and failure may result from corrosion fatigue. There have been numerous failures from this cause and the Bureau feels an outside packing gland should be fitted when the propeller shaft is next drawn for examination. The space in the counterbore should be filled with red-lead putty or some similar compound. Typical seals of this type are illustrated in section 37 of the rules.

(2) *Key and keyway.*—It has been found that the fine cracks caused by ordinary fatigue are very difficult to detect by normal visual examination so it is suggested that magnetic powder testing or other positive means of detection be used when existing shafts are drawn for inspection. The keyway and adjoining areas should be examined with particular care.

Since tool marks, nicks, scratches and the like all act as local stress raisers care should be taken to see that all such marks are carefully removed or blended into the shaft contour. All sharp corners on the keyway should be removed by grinding. There has been evidence of the key bearing excessively at the sides at the forward end of the keyway in a number of cases and it is felt that this condition should be relieved by slotting the key longitudinally for several inches or by other suitable means.

(3) *Engine speed and peak stresses.*—As stated above the magnitude of the third order critical is sufficient to contribute to eventual failure of the propeller shaft if the engine is operated for a long enough time at or near the peak. In order to alleviate this condition it is suggested that one of the following steps be taken.

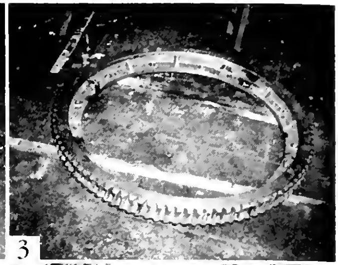
(*a*) *Reduced revolutions.*—Unless satisfactory steps are taken to alter the present propelling system, owners and operators of vessels classed with the Bureau are requested to issue instructions to limit the engine speed to a maximum of 66 r. p. m.

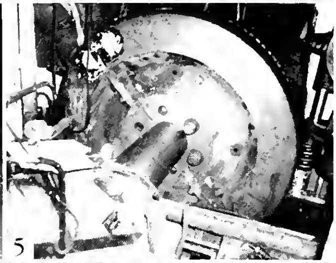
(*b*) *New propeller.*—A propeller designed to absorb increased horsepower at 66 r. p. m. will provide higher ship speed than the present propeller at this r. p. m. The WR^2 of the propeller is not particularly critical so that the natural frequency of the system can be raised only slightly by decreasing the WR^2 of the new propeller. The limiting factor in this method is the torque that can be safely transmitted by the shafting. This limits the maximum horsepower to 2,200 IHP at 66 r. p. m.

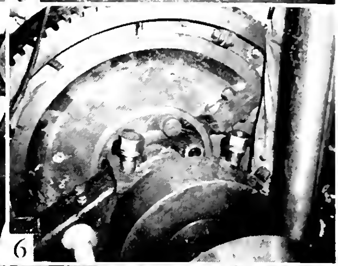
(*c*) *Flywheel.*—The natural frequency of the system can be lowered by fitting a flywheel at the after end of the engine. With a flywheel having a WR^2 of 16 million pound-inch^2 the torsional stresses can be reduced sufficiently to operate the engine at the maximum designed speed of 76 r. p. m. without other changes. The size of the flywheel may be reduced by fitting counterweights to the existing crank webs.

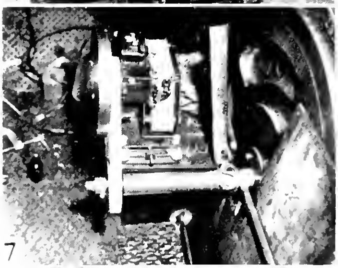
(*d*) *Larger lineshaft.*—The natural frequency of the system can be raised by fitting lineshafting having a larger diameter than the original shafting. The allowable engine speed can be raised to 72 r. p. m. by replacing two sections of the present 13½-inch lineshaft with 17-inch shafting, with no other changes in the main drive. This arrangement will permit normal operation in those services where 68-69 r. p. m. loaded, and 70-72 r. p. m. light, have been usual. By further modification along these lines, the full design speed of 76 r. p. m. can be obtained if desired.

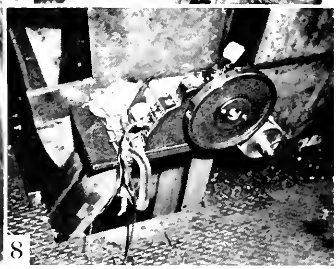
(*e*) *Periodical propeller shaft examinations.*—A











1. Flywheel in two sections.
2. Flywheel on lathe in shop.
3. Gear removed from flywheel.

4. Flywheel and gear on lathe in shop.
5. Flywheel installed on ship—aft end looking forward.
6. Flywheel installed on ship—forward end looking aft.
7. Graph instrument forward of main engine.
8. Graph instrument forward of main engine.
9. Graph instrument aft of thrust bearing.
10. Graph instrument aft of thrust bearing.
11. Graph instrument forward of stern tube—shaft alley.

ear ago the period between propeller shaft surveys for Liberty type vessels was reduced from 3 to 2 years. On he occasion of the next propeller-shaft examination the ecommendations in (1) and (2) above should also be arried out. Where changes have also been made in ac ordance with (3) (*b*), (3) (*c*), or (3) (*d*), the hafts may be returned to the regular 3-year schedule. Where no changes have been made to the propelling ystem the engine should be operated in accordance with 3) (*a*) above and the period between propeller shaft xaminations should not exceed 2 years.

While the above recommendations are considered by he Bureau to be of primary importance, study also de eloped several other suggestions which may be of inter st to the owners.

When new propeller shafts are fitted it would be desir ble to increase the keyway fillets to at least $\frac{3}{16}$-inch adius, to break all sharp corners and to provide a good nachined finish. The keyway should be shortened, with t least 2 inches clearance between the end of the liner nd the start of the keyway. It is also recommended that he key be relieved at the forward end, as described in 2) above, and that the forward key retaining screw be liminated.

Instructions should be issued to reduce speed when acing occurs, in order to avoid the high stresses to which hafting is subjected under racing conditions in heavy veather. It is suggested that a governor may be helpful n this connection.

It is suggested that periodic checks be made to main ain reasonably good division of power not only between ylinders but also between top and bottom ends of each ylinder, as it has been found that some engines are badly out of balance and this may have been a contrib iting factor in some instances of propeller shaft failures.

Liberty colliers with machinery aft do not require any hanges in the main drive and may be operated at the lesigned rpm. On the occasion of the next propeller haft examination, however, the sealing arrangement hould be changed to the outside gland referred to in (1) bove. The propeller shafts on these vessels may be re urned to the regular 3-year survey schedule immediately.

The Todd Installation on the SS John Goode

In anticipation of the action taken by the classification ociety in order to maintain the designed speed of the Liberty ships, Todd Shipyards Corporation authorized Gibbs & Cox, naval architects, to make a complete study nd prepare plans for the approval of the American Bureau of Shipping for these various recommendations. The first recommendation to be used was the installation of the flywheel installed on the main engine line shaft at he coupling between No. 6 main bearing and the thrust bearing. The size and weight, determined by calculations rom torsiograph curves, was subsequently approved by he American Bureau of Shipping and the U. S. Coast Guard.

Todd Shipyards Corporation, Los Angeles Division, was engaged to install a flywheel on the SS *John Goode*, a Liberty tanker recently purchased by the World Wide Tankers, Inc. of Los Angeles and Seattle, a wholly owned subsidiary of Time Oil Company. The flywheel was in stalled on the SS *John Goode,* using drawings furnished by Gibbs & Cox which complied with regulations and inspection by the American Bureau of Shipping and the U. S. Coast Guard.

The important parts being castings, patterns were made for the following: flywheel, worm wheel gear, and the turning gear pedestal. The rough weight of these castings aggregated 19,930 pounds including 3/8" material allowance for finish machining.

The flywheel, having been cast in halves, required facing and bolting together prior to being rough—and finished-machined in a Cincinnati vertical boring mill (Photographs No. 1 and No. 2).

The worm wheel or tooth gear was cast in four 90° sections. This necessitated facing each section prior to assembly and bolting (Photograph No. 3). The assembled gear was then laid out and formed in order to machine to diametrical pitch. After being bored to fit the flywheel, the gear was fastened to it with bolts. The finished weight of the complete flywheel (wheel and gear) was 15,005 pounds (Photograph No. 4).

The only requirement for special tools was the wrench for fastening the flywheel halves together at the nut core near the periphery of the wheel (Photograph No. 2). No special jigs or fixtures were required for the machinery operations.

While the flywheel and associated parts were being machined in the shop, the existing turning gear, shaft coupling bolts No. 6 bearing cap, piping and gratings were removed.

The completed flywheel was disassembled and lowered into place on the ship in halves. After rebolting and aligning with the coupling bolt holes, the wheel was bored for coupling bolts (Photograph No. 5). With the wheel bolted to the coupling, installation of the worm wheel gear followed (Photograph No. 6).

The No. 6 bearing cap was refitted and the turning engine was installed in its new position. After aligning the worm gear of the turning engine with the worm wheel, the pedestal foundation was drilled for fitted bolts. With the foundation secured, all alignments were checked by rotating the flywheel. Associated equipment such as piping, gratings and guards were reinstalled.

Instruments to record on paper the torsional vibrations of a rotating shaft (Geiger & Cox Torsio Graph Instruments) were installed and checked during a brief dock trial held on July 22, 1948. These machines were placed in three separate locations, namely:

1. Fwd. of the main engine on the end of the H. P. crankshaft. (Photographs No. 7 and No. 8.)
2. Aft of the thrust bearing. (Photographs No. 9 and No. 10.)
3. Fwd. of the stern tube but aft of the spring bearing. (Photograph No. 11.)

These separate locations permit (1) comparison of the recordings, (2) accurate analysis of vibration, and (3) calculations for stress curves.

Three records are imposed upon a tape simultaneously during the operation of these machines, namely:

1. Actual vibration of the shafting.
2. A timing mark in fifths of a second.
3. The number of shaft revolutions.

Each instrument has a light pulley, driven by a special

(Please turn to page 86)

The Navy's Postwar Shipbuilding and Reconversion Plan

THE NAVY DEPARTMENT recently released its immediate postwar shipbuilding and reconversion plan, mentioned briefly in *Pacific Marine Review* "Flashes" in August issue.

The Navy's 65,000-ton flush-deck aircraft carrier will be built by the Newport News Shipbuilding and Drydock Company. The flush-deck carrier is one of the 16 ships in the Navy's postwar ship building program. The new ships, together with the ship conversions authorized since the war, will provide some of the advance prototypes required for the Navy of the future.

In allocating the new ship construction and conversion work, the Navy has given careful consideration to paring the impact of this program upon the designed staffs of both the private and naval shipyards. Since the war, there has not been a sufficient backlog in the private shipyards to occupy their essential design personnel and maintain their vital ship building schedules. The naval shipyards, on the other hand, have been kept busy with a continuing program of ship repair and overhaul.

It is the Navy's purpose in preserving a balance between the private and naval shipyards to insure that a minimum nucleus of ship design and ship-building capacity in the private yards will be kept available in the interests of naval security.

The postwar ship building program includes, in addition to the flush-deck carrier, two anti-submarine cruisers, four destroyers, six high-speed submarines, and three anti-submarine submarines. Although these ships have been assigned for construction, contract negotiations have not been completed.

Other allocations are as follows:

One Anti-Submarine Cruiser, the USS *Norfolk* (CLK-1), will be built by the New York Shipbuilding Corporation, Camden, New Jersey.

The other Anti-Submarine Cruiser, as yet unnamed, will be built by the Philadelphia Naval Shipyard, Philadelphia, Pennsylvania.

Two Destroyers, the DD-927 and the DD-928, have been assigned to the Bethlehem Steel Company, Quincy, Massachusetts. The Bath Iron Works, Bath, Maine, will build the two other Destroyers, the DD-929 and the DD-930. These Destroyers, which have not yet been named, are long-range vessels, larger than their wartime predecessors. Essentially anti-submarine vessels, they will also have the speed, endurance and sea-keeping qualities which will permit them to serve with high-speed task forces.

Three high-speed submarines, the USS *Tang* (SS-563), the USS *Wahoo* (SS-565) and a third as yet unnamed, will be built by the Portsmouth Naval Shipyard, Portsmouth, New Hampshire. The three other high-speed submarines, the USS *Trigger* (SS-564), and the USS *Trout* (SS-566), and an unnamed sister ship, will be built by the Electric Boat Company, Groton, Connecticut.

One anti-submarine submarine, USS *K-1* (SS-K-1), will be built by the Electric Boat Company, Groton, Connecticut. The New York Shipbuilding Corporation, Camden, New Jersey, and the Mare Island Naval Shipyard, Vallejo, California, will build the other two anti-submarine submarines.

The Navy's postwar program includes the conversion of the following 33 ships:

Two light carriers for anti-submarine warfare.

Twelve 2100-ton destroyers to destroyer escorts (DDE).

Six 2200-ton destroyers for anti-submarine warfare (DDK).

Two destroyer escorts to destroyer escort pickets (DER).

Two submarines to troop carrying submarines (SST).

One submarine to a cargo carrying submarine (SSA).

Two submarines for Polar picket service (SSR).

One submarine to submarine oiler (SSO).

One cargo ship for Polar service.

Two landing ships dock for Polar service.

Although all of these conversions will be undertaken by the naval shipyards, no determination has yet been made as to which naval shipyard will convert one light carrier and six destroyers for anti-submarine warfare. Included in these conversions are two additional Essex Class aircraft carrier conversions, one to be accomplished at the New York Naval Shipyard on the East coast and one at the Puget Sound Naval Shipyard on the West coast. These conversions are similar in scope to the work being carried out now at the New York Naval Shipyard on the carrier *Oriskany*. It is part of a contemplated naval program to improve the entire group of Essex class carriers. The work on each ship will require about 1,500 additional navy yard employees for each carrier. The tabulation which follows below reflects the assignments made to date. In not every instance are the names of the vessels available at this time:

Two Essex Class Fleet Carriers

USS *Essex* (CV-9)—Puget Sound Naval Shipyard, Bremerton, Washington.

USS *Wasp* (CV-18)—New York Naval Shipyard, Brooklyn.

Two Light Carriers for Anti-Submarine Warfare

USS *Bataan* (CVL-29)—Philadelphia Naval Shipyard, Philadelphia.

One—not selected. Not assigned.

Twelve 2100-Ton Destroyers to Destroyer Escorts (DDE)

USS *Conway* (DDE-507)—Boston Naval Shipyard, Boston.

USS *Cony* (DDE-508)—Boston Naval Shipyard, Boston.

USS *Saufley* (DDE-465)—Charleston Naval Shipyard, Naval Base, South Carolina.

One—not selected. Charleston Naval Shipyard, Naval Base, South Carolina.

Two—not selected. Norfolk Naval Shipyard, Portsmouth, Virginia.

USS *Nicholas* (DDE-449)—Long Beach Naval Shipyard, Long Beach, California.

USS *O'Bannon* (DDE-450)—Long Beach Naval Shipyard, Long Beach, California.

USS *Fletcher* (DDS-445)—San Francisco Naval Shipyard, San Francisco.

USS *Radford* (DDE-446)—San Francisco Naval Shipyard, San Francisco.

USS *Walker* (DDE-517)—Mare Island Naval Shipyard, Vallejo, California.

USS *Sproston* (DDE-577)—Mare Island Naval Shipyard, Vallejo, California.

Six 2200-Ton Destroyers for Anti-Submarine Warfare (DDE)

Six—Not selected. Not assigned.

Two Destroyer Escorts to Destroyer Escort Pickets (DER)

Two—Not selected. Norfolk Naval Shipyard, Portsmouth, Virginia.

Two Submarines to Troop-Carrying Submarines (SST)

USS *Perch* (SST-313)—Mare Island Naval Shipyard, Vallejo, California.

USS *Sealion* (SST-315—San Francisco Naval Shipyard, San Francisco.

One Submarine to Cargo-Carrying Submarine (SSA)

USS *Barbaro* (SSA-317)—Mare Island Naval Shipyard, Vallejo, California.

Two Submarines for Polar Picket Service (SSR)

USS *Tigrone* (SSR-419)—Portsmouth Naval Shipyard, Portsmouth, New Hampshire.

One—Not selected. Portsmouth Naval Shipyard, Portsmouth, New Hampshire.

One Submarine to Submarine Oiler (SSO)

One—Not selected. Mare Island Naval Shipyard, Vallejo, California.

One Cargo Ship for Polar Service

USS *Arnab* (AKA-56)—Philadelphia Naval Shipyard, Philadelphia.

Two Landing Ships Dock for Polar Service

USS *Gunston Hall* (LSD-5)—Puget Sound Naval Shipyard, Bremerton, Wash.

USS *Lindenwall* (LSD-6)—Puget Sound Naval Shipyard, Bremerton, Wash.

Submarine Naval Architecture

by A. I. McKee

Editor's Note: The Naval construction program outlined above brings into the spotlight a paper on Submarine Naval Architecture by A. I. McKee of the Electric Boat Company, presented before the April meeting of the New England Section, Society of Naval Architects and Marine Engineers, and which the Society has authorized us to publish.

THE Naval Architecture of Submarines follows, of course, the same laws that apply to all floating bodies. Some special conditions, however, are encountered in submarine design and these conditions require special treatment. This paper will discuss those special conditions.

Displacement and Weight

Before entering upon a discussion of displacement, it is desirable to mention that certain spaces are conventionally not included in the displacement.

a. The non-watertight ends of the ship which flood freely from the sea are not included.

b. The superstructure and fairwaters, which flood freely when they are below the surface, are not included.

c. Tanks wholly above the waterline in the surface condition which are normally flooded when the ship is submerged are not included. The bow buoyancy tank which is open at the bottom, but which is otherwise tight and which is provided with a vent valve so that its flooding is controlled, is an example of such a space. On some of the earlier submarines, sections of the superstructure were provided with both flood valves and vent valves but, as they were wholly above the surface waterline, they were not included in the displacement.

The structural material used in the construction of these spaces actually displaces water when the ship is submerged and is, therefore, included in the displacement as an appendage.

Although these spaces provide no buoyancy which is useful for weight carrying purposes, they do not flood or drain instantly, and therefore do provide buoyancy for a short time and improve the seaworthiness of the ships and act to a certain extent as antipitching tanks.

Tanks, pipes and fittings above the surface of the

water and which are either empty or full both on the surface and submerged, are included in the displacement as appendages.

Of course, on any ship the displacement must always be equal to the weight. In speaking of a submarine it might be better to say that the weight must be equal to the displacement. For, in the submerged condition, the displacement is a fixed amount and we cannot add a few tons and, without giving it a thought, expect the displacement to adjust itself to the increased weight. This simple fact cannot be treated lightly, for it means that throughout the life of the ship we cannot add any weight without removing something else of equal weight. And we cannot even deduct any weight without adding something of equal weight. Those of you who were repairing the combatant ships during the recent war will remember how difficult it was to compensate for the additional guns, ammunition and Radars. You could at least take off more weight than you needed for compensating purposes if you could find it. But on submarines we cannot even do that; it must be exactly the same amount. Not only that, but the longitudinal moment of the weight removed must be the same as that of the weight added. These submarine rules apply to changes in weights made by the forces afloat as well as to those made by the repair yards, while there were times when the surface ship rules were not observed by the ships' companies. This weight and moment compensation applies to the changes in fuel, lubricating oil, provisions, ammunition, and expendable stores and the compensation must be made several times a day when the submarine is operating. Furthermore, rather than rely on the calculated compensation for too long a period, it is the practice on most submarines to dive at least once a day to check and correct the weight and moment compensation.

For these normal expenditures which constantly reduce weight when a submarine is at sea, the design includes a group of tanks, called variable ballast tanks, into which water can be taken or from which it can be removed as required to compensate for weight changes. By placing some of these tanks near the ends of the ship, they can also be used to compensate for changes in longitudinal moment.

The largest and most rapidly changing weight on a submarine is the fuel. Rather than provide variable ballast tanks large enough to compensate fully for changes in the weight of fuel on board, water is admitted to the fuel tanks under slight pressure and the fuel, which floats on the water, is taken from a connection at the top of the tank. Since the fuel tanks are always full of liquid, we can take advantage of this fact to save some weight in the construction of the ship. By applying sea puressure to the liquid in the tank we can make the external boundaries only strong enough to maintain oil tightness at low pressure, instead of making them strong enough to withstand sea pressure. Now, since sea water is about 20 per cent heavier than the fuel used on submarines, the expenditure of fuel results in a gradual increase in weight which is in part compensated by the expenditure of other weights and in part by the removal of water from the variable tanks. This automatic over-compensation for fuel expended has the effect of making the submarine appear to be light when all fuel tanks are filled and heavy when there is no fuel on board. This makes the variable ballast tanks fairly well filled when the submarine starts a long patrol and fairly well emptied at the end of the patrol. We take advantage of this fact by carrying additional fuel in some of the variable ballast tanks. We can also avoid carrying water in all of the fuel tanks by fitting some of these tanks with flood valves and vent valves to permit their being used as main ballast tanks after the fuel is expended. This gives lighter surface displacement and more freeboard and reserve buoyancy as the patrol goes on. Tanks of this sort are called fuel ballast tanks.

The use of water ballast for making weight compensa-

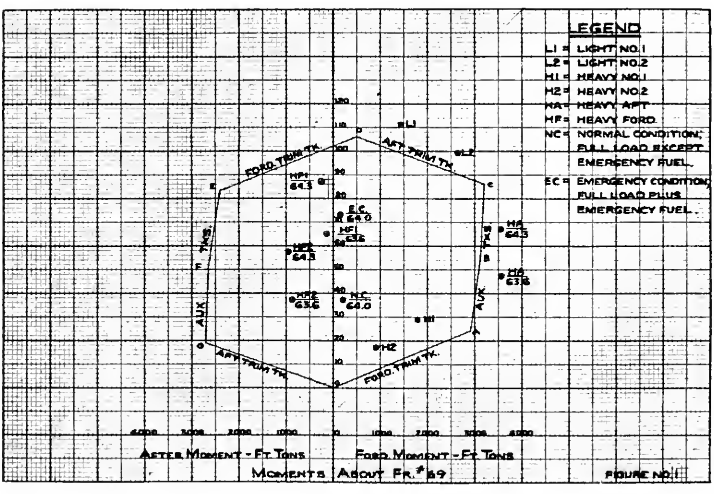


Figure No. 1

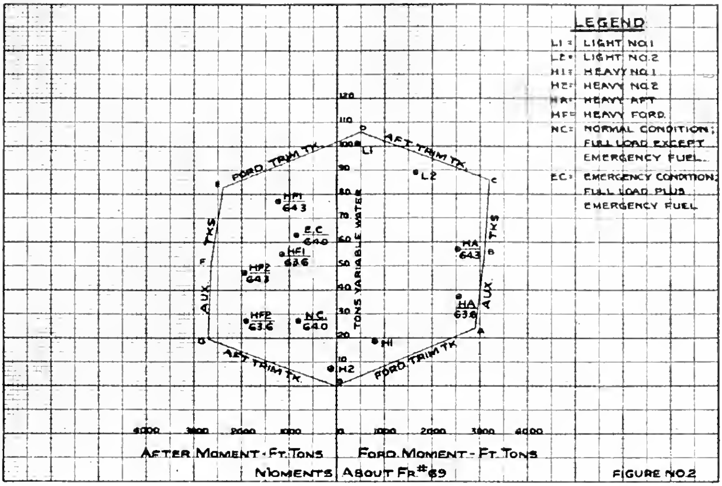


Figure No. 2

tions during the course of normal submarine operations is a very satisfactory method as well as the only practicable one. But it is not suitable for the permanent weight changes, almost always increases, which occur during the life of the ship. For this purpose there is indicated in the design some lead ballast. The present practice is to have about 5 per cent of the normal surface displacement as lead ballast. The lead in a good design should be near the midlength of the ship.

Now space is at a premium inside the pressure hull of a submarine. In fact, considerations of space rather than of weight are apt to determine the size and therefore the displacement of a submarine design. So it is desirable to devote as little space as practicable to the variable ballast tanks. To determine the capacity and distribution of these tanks, a series of calculations is made as the design approaches completion, representing the ship in the following conditions:

(1) Light No. 1 (after refueling at sea followed by an engagement).
(2) Light No. 2 (at the end of an extended patrol).
(3) Heavy No. 1 (at the end of an unsuccessful high speed surface opertation).
(4) Heavy No. 2 (leaving for a long submerged patrol).

The load carried in each of these conditions is as light (for the light conditions) or as heavy (for the heavy conditions) as could reasonably be expected to be encountered. Furthermore, in the light conditions the ship is assumed to be operating in the most dense water and, in the heavy conditions, in the least dense water ever encountered in the open sea. In addition three other conditions are calculated with the loading as badly balanced longitudinally as is reasonably possible. These conditions are called:

Heavy Forward No. 1.
Heavy Forward No. 2.
Heavy Aft No. 1.

They are calculated with both the maximum and the minimum density of the sea water. The object of the calculations is to determine the amount and longitudinal moment of the variable water ballast required to place the ship in equilibrium when submerged. From the calculations an Equilibrium Diagram such as Fig. 1 is prepared. The weight and moment of the variable water ballast in each of the above conditions is plotted as a point on the diagram and marked L-1, L-2, H-2, etc. The area inside the figure on this diagram represents the weight and moment that can be obtained by water in the variable ballast tanks. The figure is plotted as follows:

A. represents, in capacity and forward moment, the foremost of the variable ballast tanks.
B. represents the two foremost tanks.
C. represents the three foremost tanks.

This is continued until at D all variable ballast tanks are assumed to be full.

Similarly, point

G. represents the aftermost tank
F. represents the two aftermost tanks, etc.

until point D is reached again with all tanks filled.

If all the points for the various assumed conditions fall within the figure, the variable tanks are large enough and the ship is properly ballasted. If, as is usual on the first attempt, the points do not fall within the figure, we see if all the points can be moved together to new positions in which they all would be included within the figure. If they can, then the tanks are large enough but the ship is not properly ballasted. Fig. 1 is the equilibrium diagram of a ship on which the variable ballast is large enough but with very little capacity to spare. Since the points do not fall within the figure, the ship requires a change in the lead ballast. By adding 10 tons of lead with a forward moment of 1,000 foot tons, the points are moved to the positions shown in Fig. 2. The ship will then be properly ballasted.

The ballasting or reballasting of a completed sub-

(Please turn to page 98)

National Defense as Related to Port Authorities

Colonel T. J. Weed

THE August issue of this publication reviewed the convention of Pacific Coast Port Authorities held in San Francisco during July. In order to give more detailed attention to the panel discussion on the subject of national defense, presided over by General Robert H. Wylie of the San Francisco Port, the subject was continued to this issue. Participating in the discussion were Colonel Warren Lamport, Manager, Port of Seattle; Captain A. H. Richards, Port Director, 12th Naval District; and Colonel T. J. Weed, Executive Officer to the Chief of Transportation, U. S. Army. Important parts of Colonel Weed's talk follow:

As the transportation corps is one of the largest users of terminal facilities, it is the sincere hope of the Chief of Transportation that conditions will enable the port authorites to effect at the earliest practicable time the modernization of their facilities, and that where the demand is sufficient to warrant the expenditure of the required capital, it is hoped that these port facilities will be expanded. It is also important that the smaller ports shall receive appropriate attention. It should be obvious that in deploying our forces to cope with conditions in any future emergency and to furnish these military forces with proper logistical support when they are operating overseas, It will be necessary undoubtedly that greater use be made of the smaller ports than has been the case in the past.

At no time during the latter part of the war were there sufficient port facilities on the West Coast to meet requirements. Approximately six million measurement tons of cargo were moved from East Coast ports to bases in the Pacific. This movement occurred from December 1941 to August 1945. During the latter part of the war 50 to 60 vessels per month had to be loaded at East Coast ports for pacific bases. These facts mean that had our country been forced to undertake extensive combat operations in China and Japan, it was estimated that it would have been necessary to load as many as 200 vessels per month at East Coast ports in order to furnish the required logistical support for military operations in the Orient. The loss to us under those circumstances would have been reflected by:

(A) An increase in vessel turnaround time;

(B) Millions of additional tons of supplies required in the pipeline enroute to the fighting forces;

(C) An increase in supplies required in reserve in this country and abroad due to the length of time necessary to accomplish delivery of the supplies to troops at the front;

(D) Increased use of manpower due to additional vessel crewing requirements,—more ships would have been required under those conditions.

(E) Exposure of vessels and their cargoes to enemy attack for much longer periods of time, entailing losses at sea.

These would have been the additional costs to the national economy and to our war-making potential above that required had adequate facilities been available o nthe West Coast.

Subsequent to the termination of active hostilities in World War II, the transportation corps has been operating four ports of embarkation. One of these is located here in San Francisco, one is at Seattle, and the other two are located at Brooklyn, and New Orleans, respectively. These ports are charged with the responsibility of transshipping personnel and support supplies to our troops overseas. These overseas commands are located in Alaska, Japan, and Korea; also on Guam, in Hawaii, and on a number of other islands in the far Pacifiic such as the Philippines, Okinawa, and the Ryukyus. Across the Atlantic we have occupation forces in Germany and in Trieste. We also have bases in Newfoundland and elsewhere in the Atlantic. In addition we have military forces occupying bases in the Caribbean and in the Panama Canal Zone. From press accounts of current activities overseas, it may be assumed that our reports in connection with furnishing direct support supplies and in moving personnel to and from our overseas commands are in themselves important and extensive operations. The position of the Chief of Transportation regarding the use of different ports for transshipping relief and civil aid cargoes has been and continues to be one of impartiality. He would like for it to be clearly understood that any port may share in that business if it has adequate facilities to handle these cargoes and is situated with respect to freight rates so as not to require the movement through the port to be any more expensive to the government than would be the case were the cargo to move via any other available port.

It is important that piers should be fire resistant; also that they should have adequate access roads for both rail and motor traffic and that these roads should be constructed to facilitate the handling of a larger volume of traffic should an emergency arise; also that where piers have more than one deck, those decks which are above ground level should be equipped with suitable ramps to

(Please turn to page 85)

The Selma Salen

ANOTHER fine example of European-constructed motor ships to arrive in regular service between Europe and the Pacific Coast is to be found in the new 10,000 ton *Selma Salen*. This ship was built in Taranto, Italy, to the order of Sven Salen of Stockholm, Sweden.

The vessel is of modern design with a cargo capacity of 640,000 cubic feet in six holds, three forward and three aft of the engine room. The double bottom extends the entire length of the ship and carries fuel and water.

The engine is a two-stroke double-acting seven cylinder Fiat of 6,000 brake horsepower which gives an indicated load speed of 16½ knots. On the trial trip the ship attained a speed of over 18 knots.

Most of the current production of European vessels have luxurious passenger accommodations and the *Selma Salen* is outstanding in this respect. The cabins are commodious and the decorations and furnishings are noteworthy. As usual for cargo ships, the passenger accommodations are limited to twelve persons in single and double cabins.

The route of the *Selma Salen*, as for the entire fleet of seven ships of the Salen-Skaugen Line, will include Manila, Shanghai, Taku Bar and Hong Kong.

The livewire agents in the United States for the Salen-Skaugen Line are the Interocean Steamship Corporation of San Francisco with offices in Atlantic and Pacific Coast ports. On arrival in San Francisco the *Selma Salen* welcomed aboard a thoroughly representative group of

The Selma Salen at her San Francisco pier on maiden voyage to Pacific Coast.

Scenes aboard the Selma Salen during rousing reception given the vessel by friends of the Interocean Steamship Corporation. In the center picture Harry Brown and Erik Krag appear during an orchestral number Many trading and shipping notables appear in the upper and lower scenes

These pictures were taken in the private office of President Brown and Executive Vice-President Krag The large screen in the upper and middle scenes depicts the history of shipping from the Ark to the Gjoa. The lower corner shows cabinets and glass oillars containing ship models.

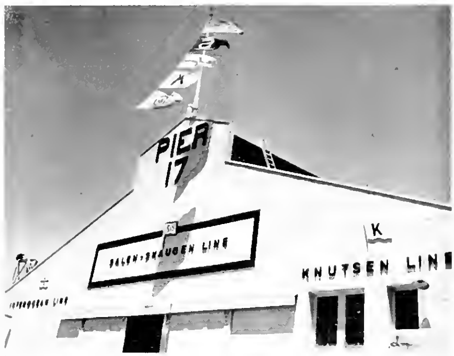
This is a picture of San Francisco's Coit Tower on Telegraph Hill viewed beyond the bow of the Selma Salen.

the shipping public and the press who were entertained with orchestral music and luncheon while top officials of the company explained the ship's features and the trade opportunities along its route.

Official roster of the Interocean Steamship Corporation is as follows:

Harry Brown .... *President*
Erik Krag .... *Executive Vice-President*
R. W. Cabell .... *Vice-President*
Andrew A. Moran .... *Vice-President*
R. G. Thomas .... *Treasurer and Controller*
E. Berlund .... *Secretary*
S. F. Alioto .... *Traffic Manager, European*
H. B. Godwin .... *Traffic Manager, Oriental*
E. Walker .... *Traffic Manager, Intercoastal and South America*
J. F. Litz .... *Operating Manager*
A. M. Balkunas .... *Assistant Operating Manager*
S. A. Hess .... *Operating Department*
Homer Harris .... *Assistant Traffic Manager*
Stanley Page .... *Traffic and Passenger*
Peter C. Holm .... *General Freight Agent*
C. M. Noble .... *Intercoastal Department*
R. I. Jacobs .... *Purchasing Agent*

San Francisco's famed Pier 17 with Interocean's house flags.



Anti-Yawing of Barges Studied at Stevens Towing Tank

Anti-yawing tests now being carried out on a model barge at the Experimental Towing Tank of Stevens Institute of Technology are directed toward keeping a straying barge in line. The barge itself, represented by the model in these tests, will be used by the Esso Standard Oil Co. in harbor bunkering service.

Yawing is the tendency of a barge, being towed in open water, to go off its course, thereby causing more strain on the towing tug and generally decreasing speed. Tests are being made with a wooden model barge seven and a half feet long, built on the scale of three-eighths of an inch to one foot. Various tests will be made to find out the barge's yawing stability and to determine what design in skegs will enable the barge to track behind the tug without going off its course. A skeg is a kind of metal keel placed under the after overhang of a barge. Usually two are used, one at each side.

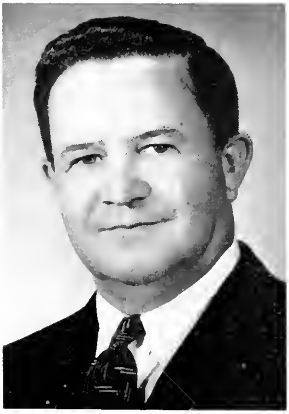
During tests in the tank, the model will be towed by an overhead carriage at various speeds equivalent to the range of full sized operating speeds of the barge. Different arrangements of tow lines and bridles will be used and tests made to approximate disturbances like cross currents and waves which might start the barge yawing. The model barge will also be started off on an erratic course to determine how long it takes to recover.

After a suitable design of skegs has been found for enabling the barge to track on a straight course, resistance tests will be run to find out what operating speed is the most economical.

The actual barge will be 242 feet long with a 38-foot beam, drawing 13 feet of water with a displacement of 3,140 tons. It will be built by the Dravo Corporation at its Neville Island Yard in Pittsburgh.

Safety in Ship Repairs

By W. A. HARRINGTON
Manager, Bethlehem Steel Company, Shipbuilding Division, San Pedro Yard



W. A. Harrington, above, has been manager of the San Pedro, California, yard of the Bethlehem Steel Company since last December. In 1916 he moved to the West Coast and became a loftsman and an inspector of ships for the Shipping Board. He came to the San Pedro Yard in 1923 as Chief Estimator and later was General Yard Foreman and Sales Manager. In February 1944 he was made Assistant Manager.

WE FEEL that the modern concept of shipyard safety may be said to have first been given real emphasis during and immediately following World War I, and with steady strides of advancement continuing up to World War II. Then, as you know, the high-pressure armament program of World War II made necessary a hitherto inconceivable general advancement in accident prevention concepts and techniques. The shipbuilding industry problem in procuring, training and utilizing manpower was, of course, very similar to that of industry as a whole, so it is unnecessary for me to go into details on that point. Suffice to say, the problem was a tremendous one for all of us.

I am going to confine my remarks, in the main, to a shipbuilding and repair operation with which I am most familiar, that being the San Pedro Yard of the Bethlehem Steel Company's Shipbuilding Division. This particular ship yard was a "war baby" of the first World War. It was constructed in 1918 and incorporated under the name of Southwestern Shipbuilding Company, for the express purpose of constructing cargo vessels for the United States Shipping Board, and supplemented by the construction of large oil tankers for the Union Oil Company and the Royal Dutch Shell Oil. The Yard was acquired by the Bethlehem Steel Company in 1922 and operated from 1922 to he end of 1940 solely as a ship-repair yard. In 1940, facilities were improved to accommodate a construction program for the U. S. Navy which included twenty-six destroyers and four large ocean-going tug boats. The first destroyer keel was laid in May of 1941. During this construction program, a heavy load of ship repair and alteration work was performed, much of which was done along the water-front and in Long Beach. I was responsible for this ship repair work and therefore feel that I am qualified to talk to you on *"Safety In Ship Repairs."*

Our broad general safety policy is not a new one nor one which is peculiar to our company—it is simply the good common sense idea of placing accident prevention in its proper order of importance in the organization and procedural pattern. Twenty years ago, the president of our company said, and I quote: "Accident prevention work pays three-fold returns. There is a return to the employer in lower costs, a return to the employee in a physical and monetary saving, and a return to the community through a lessening of care for the maimed and disabled. Any of these alone justifies the work, but taken in the aggregate, they constitute one of the most important planks in good business." Our policy may be summed up very simply in one sentence: Safety is the *first and most important* consideration of *administrative* and operating procedure.

Now, as to our method of actually putting the program into effect and maintaining it to a high degree, there is one essential first step and that is a clear and definite statement of the policy of management in regard to accident prevention. We have made it a practice to hold a Management Safety Meeting at least once each month and use those occasions to make clear and definite statements of the management's position on safety matters. Included in this group are all department and divisional heads. In our case, for a payroll force of approximately 1,000 employees, the management group numbers about thirty-five. Our Safety Engineer fits into the organization picture as a staff expert, advising management on accident prevention and related activity. Here, the important thing, of course, is to take his advice and act on it.

To continue the line of instruction and information to the next step in production authority, we use the departmental meeting idea, but confine it to supervisory personnel, who in turn instruct their employees in safety and see that it is practiced to the finest degree. Employee participation in our program comes through an Employee

*Address delivered before the Shipyard Panel, Western Safety Council, June 18, 1948.

Safety Committee, which committee assists the Safety Engineer by reporting any unsafe conditions.

We have found that a great deal of good can be accomplished, from the management point of view, in securing voluntary cooperation of employees in accident prevention work. All suggestions from members of such committees are given thoughtful consideration and discussion, regardless of how fantastic any suggestion may seem. As a matter of fact, *any* safety suggestion from *any* source receives careful consideration by management and, in this regard, may I emphasize to you that safety in Bethlehem's operations is a direct order from the Chairman of the Board, and expense involved in making working conditions safe is not to be considered.

The accident prevention problems of ship repair work are, of course, many and varied. Our shop problems are the usual ones of housekeeping, mechanical guarding, use of personal protective equipment, etc., presenting no unusual situations. Work aboard vessels in our Yard for repairs or alterations, however, is an entirely different situation, more similar to a combination of the problems encountered in steel building construction and petroleum industry tank and equipment repair and alteration. By far, the major portion of our work is the alteration and repair of oil tankers. These, then, are our major safety problems.

I assume you gentlemen are, generally speaking, aware of the construction of a tankship—more commonly referred to as a tanker. However, for the benefit of the uninformed, it is a vessel divided into compartments or tanks by steel bulkheads for the purpose of carrying liquid cargoes. It is also equipped with a complete piping system and auxiliary cargo pumping unit for loading and discharging cargoes. Our work involves the repair or alteration of any part of the vessel, including the hull bulkheads, decks, cargo handling system, main engine, auxiliaries, shaft and propeller, electrical system, ventilation, rigging, deck fittings and accessories. Crafts involved may be any or all of approximately fifty trades.

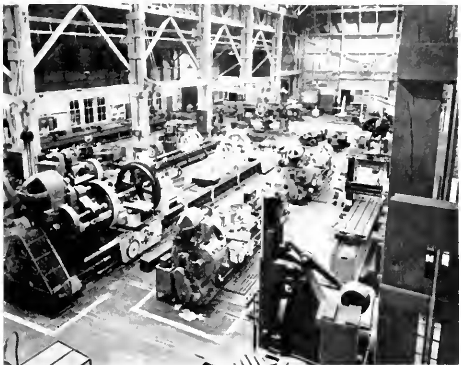
Of major importance is the control of factors that may be the means of creating an accident, such as gangways, ladders, staging, and pneumatic tools. Housekeeping, mechanical and manual handling of material and equipment, and the great variety of engine room setups arising out of main and auxiliary engine work, are also very important basic considerations. However, of all of the many hazards of tanker repair work, we consider the threat of fire and or explosion the greatest single disaster possibility with which we must contend. You all are, no doubt, familiar with the danger attendant to an empty gasoline or fuel tank in which the small residual amount of petroleum products remains to volatilize and mix with air to form a highly explosive, or at least inflammable, mixture. That, on a fairly large scale, is our problem.

Repairs, conversion and/or alteration of ship's compartments, and pipe lines, can be performed safely and efficiently provided a few precautionary measures are conscientiously used. Observance of these safe operating procedures facilitates production, while ignoring them invites destruction. Our first assumption in undertaking tanker work is that all compartments, pipe lines and pumps are hazardous until proved safe by test. Such tests

Top: This picture shows modernization of machine shop. Rearrangement of machines facilitates mechanical guarding and production.

Center: Swinging a 46-ton main crankshaft section aboard a vessel under repair. Rigging and control of suspended piece by means of tag lines is extremely important.

Bottom: Staging on drydock T-2 type tanker to facilitate installation of bilge reinforcing strap.



are made by a certified chemist approved by the American Bureau of Shipping. The certified chemist must concern himself with many possible conditions, among these are:

(1) The presence of vaporized explosive or inflammable liquids—in which case he must determine whether the concentration is safely below the lower limit of its harmful effect on men inhaling the atmosphere, or the lower limit of its explosive or inflammable range, whichever is lower.

(2) Oxygen deficiency—an empty closed tank may have insufficient oxygen merely due to rusting of the steel plates.

(3) Unexpected toxic and explosive gases are sometimes generated by certain cargoes, particularly those of vegetable origin. Dangerous gases are often liberated during decomposition of some of these substances. Methane has been found in tanks of fresh water from the tropics where vegetable matter decays rapidly. It is odorless, colorless and tasteless, and is explosive in comparatively small concentrations.

Before starting repair operations, it is necessary to consider not only what has been stored in the tank, but also the exact work to be done. A tank will become hazardous if certain operations are done upon it—such as a repainting job, prolonged acetylene welding or cutting, or burning on painted surfaces. Similar hazards exist in performing repair operations on pipe lines, and necessary precautions should be taken before starting repairs. The certified chemist is required to submit a

General activity in the outfitting and repair basins showing the maintenance of gangways, ladders, stagings and good housekeeping.

report of his tests in certificate form showing not only the atmospheric condition of each compartment, but also indicating whether or not the chemist has actually entered the compartment and examined it carefully for deposits of oil and or sediment which may generate vapor. Without such an examination, the analysis of the atmosphere means nothing more than that the tank is safe for a man to enter at the time of testing. The practice of taking samples by means of a sampling tube or sampling bottle lowered from the deck is entirely inadequate except for preliminary information.

The chemist is also required to note in his certification the cargo and or liquid last carried in each tank or compartment tested. If the cargo was crude oil, the certificate must indicate the nature, i.e., the volatility, whether light or heavy, gaseous, etc. The certificate must also show the exact time certification is made and what type of work can be performed in each particular compartment, and under what weather conditions. For example, if conditions in the tank are such that by reason of a rise in atmospheric temperature gases are given off by scale or sludge, a dangerous condition may develop. The chemist so states on his original certificate and makes frequent inspections to make sure that the tank remains in a gas-free condition.

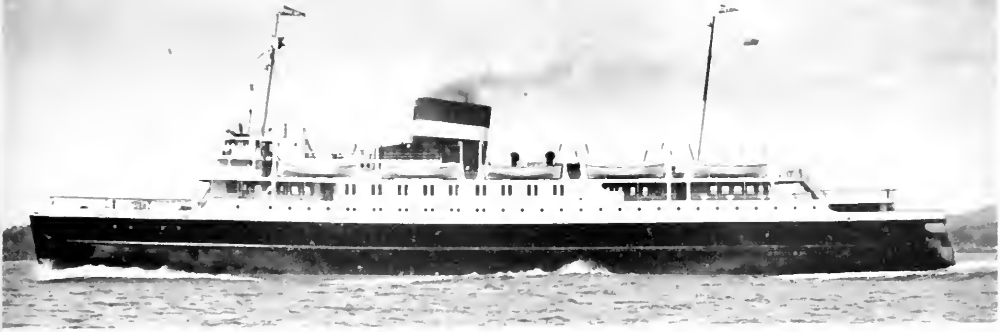
Copies of the chemist's certificate are given to the highest ranking officer of the vessel, the yard superintendent, and yard fire chief, and a copy is posted at the head of the gangway on the vessel. If any retests are made by the chemist on any tank or space, the previous certificate is replaced by a new certificate. In order that no possible misunderstanding can occur, the condition of the tanks is indicated by one of three notations: "Safe for Men and Fire"; "Safe for Men—Not Safe for Fire"; "Not Safe for Men—Not Safe for Fire". The three notations which I have enumerated have been established by the American Bureau of Shipping in order to avoid a possible misunderstanding.

Tanks containing fuel oil and tanks that have been certified "Safe for Men—Not Safe for Fire", are plainly marked with signs and no hot work is permitted to be performed on or near them. Hot work, so called, consists of electric welding, flame cutting with acetylene torch, heating with an acetylene torch, or riveting. Any shifting of fuel oil or ballast, or the opening of cargo valves or pumps after repairs have started, must be done only with the knowledge and approval of the Yard Superintendent who issues any special instructions which may be necessary. The chemist is advised of such changes and is required to make another test.

All fires and/or explosions are not always the result of carelessness in ship repair procedure. For instance, we had a case where a ship was loading gasoline some distance away from our Yard. The fumes were carried by the very light afternoon breeze into the pump room cowls of the ship undergoing repairs at our berth, fouling the pump room. Only the vigilance of the leaderman in recognizing the dangerous odors and halting all work until the danger had passed, saved us from what might have been a serious casualty.

There was a case in the Harbor Area where a serious fire resulted from a spill which had been carried by the

(Please turn to page 64)



The Prince George

S. S. Prince George

The new Canadian National S.S. *Prince George*, largest passenger ship ever to be built in a Canadian West Coast shipyard, made its first cruise to Alaska from Vancouver in June.

The *Prince George* is strictly a British Columbia product. It was designed by the Vancouver naval architect, W. D. McLaren, and was built by Yarrows Ltd. in Victoria. Every possible product of British Columbia was used to construct and equip the ship, but one of the main attractions of the cabin arrangement is the Arnot berths that fold into the wall. She is a floating example of what can be built in British Columbia shipyards.

DIMENSIONS OF SHIP

Length Overall	350 feet	
Beam	52 feet	
Depth moulded	27 feet 6 inches to main deck	
Draft	17 feet 6 inches	
Gross tonnage	5812 tons	
Displacement loaded	5022 tons	
No. of passengers	First class	290
	Second class	24
	Portable standees	84
	Officers	23
	Crews	109

The new *Prince George*, built and equipped at a cost of more than $3,000,000 is completely modern in all respects, even to her streamlined appearance, accentuated by her single funnel. With all outside passenger rooms, accommodations include deluxe, standard and special staterooms. Spacious lounges and decks afford all of the facilities and conveniences so popular with sea travelers.

The contract for the *Prince George* was let to Yarrows Ltd. in July 1946. The keel was laid December 4, 1946, and the launching took place October 6, 1947. The engines and boilers arrived on November 28, 1947, and were all placed aboard the ship in one day, November 29, 1947.

Drydocking for trials and removal of launching equipment took place on March 20, 1948; steam was raised March 30, 1948. Dock trials commenced April 1, 1948, builder's trials at sea, April 24, 1948, acceptance trials June 1, 1948.

Deluxe stateroom. All staterooms are equipped with telephones.

Smoking room, aft on promenade deck.

Section of the large observation room.

Safety in Ship Repairs

(Continued from page 62)

tide to a vessel repairing some distance from the ship that was loading. A spark from a welding torch set off the conflagration which cost several lives and the loss of much property. As with any other set of regulations or procedure, there are exceptions.

The only exception to the foregoing procedure is when a vessel has to drydock for examination, bottom painting, or enter the Yard for repairs confined solely to work in places remote from the cargo tanks or any other hazardous compartments or bottom work. In the event that we make an exception in a case of this kind, all cargo and other potentially hazardous compartments are tested by the chemist and any which are found to be hazardous are sealed and posted during the entire time the vessel is in the Yard. Hot work may be performed on the bottom of the vessel if conditions permit during an emergency. Of course, a vessel having a seriously damaged bottom or in a sinking condition would be drydocked immediately with such special instructions as might be necessary to insure the safety of the workmen, the vessel, and the property of the company.

Control of all of these factors relating to fire and explosion control is in the hands of our Yard Fire Department which receives copies of specifications of all work to be performed, and acts as co-ordinating agent between our production departments and the certified chemist. The Yard Fire Department arranges all tests, inspects the work site, supplies fire watches where necessary, and issues instructions to production departments outlining limitations of hot work. The Yard Fire Department also posts standard warning signs as required and is empowered to stop any activity that it considers hazardous. Our records for the past five years show that this fire and explosion program has held our losses from such accidents to an extreme minimum, with a total dollar loss of only $1,069. on approximately 1,900 ships repaired at our yard.

As I have implied, it is of the utmost importance that the production, yard fire, and safety departments work together in the closest cooperation to cope with the hazards not only of explosive mixtures, toxic or deficient atmospheres, but also on the various other hazards encountered in the performance of the work.

Hard hats, are, of course, a "must" on all of our ship repair work, including all drydock work, and standard eye protection measures against the various eye hazards are practiced.

Wherever necessary, fresh clean air is supplied continously to tanks or compartments to make certain that no toxic fumes remain and that there is enough oxygen permitted at all times. In order to maintain clean air in compartments where welding is in progress, we employ exhausters. These pick up fumes and expel them into the open air.

It is extremely important that temporary electrical conductors be kept in first-class condition. All are returned to the shop for inspection and test after each job, in addition to being under constant inspection while in use. This includes power leads for temporary lighting, ventilation, portable electric tools and for electric welding as well as shore lines for temporary power for the ship circuits.

In discussing electrical safety, I am reminded of the importance of grounding electric apparatus by use of four wire grounded receptacles in all distribution boxes throughout the Yard, including the drydock. Another important safety "must" at our Yard is the bonding of vessels immediately upon entering drydock. Casualties have occurred in eastern yards when workmen were permitted on the dock to carry out their work before the vessels were bonded.

We use a great deal of hose of various kinds which is kept under the same surveillance as the electric leads, being returned regularly for tests. In this connection we have set up a procedure to control not only oxy-acetylene hose, but also the gauges and torches used in this work. Such gear is required to be returned to our tool room at least once every thirty days for testing. All gauges are date stamped on the dial face under the glass with the date of each test.

In the matter of making heavy lifts in engine rooms or on any other part of the ship—one is only as safe as the inspection of slings, clevises and lifting gear reveals. Our shackles and all forgings which form part of equipment are either gamma rayed or magnifluxed at regular intervals to check for imperfections; also chain falls, blocks and tackle of all kinds are closely scrutinized, and defective gear becomes scrap.

Staging brackets and planks are inspected by the supervisors at the time of erection, and again all planks are inspected when the stages are removed. Defective planks are immediately cut up so as to prevent any possibility of their use, and defective brackets are disposed of as scrap.

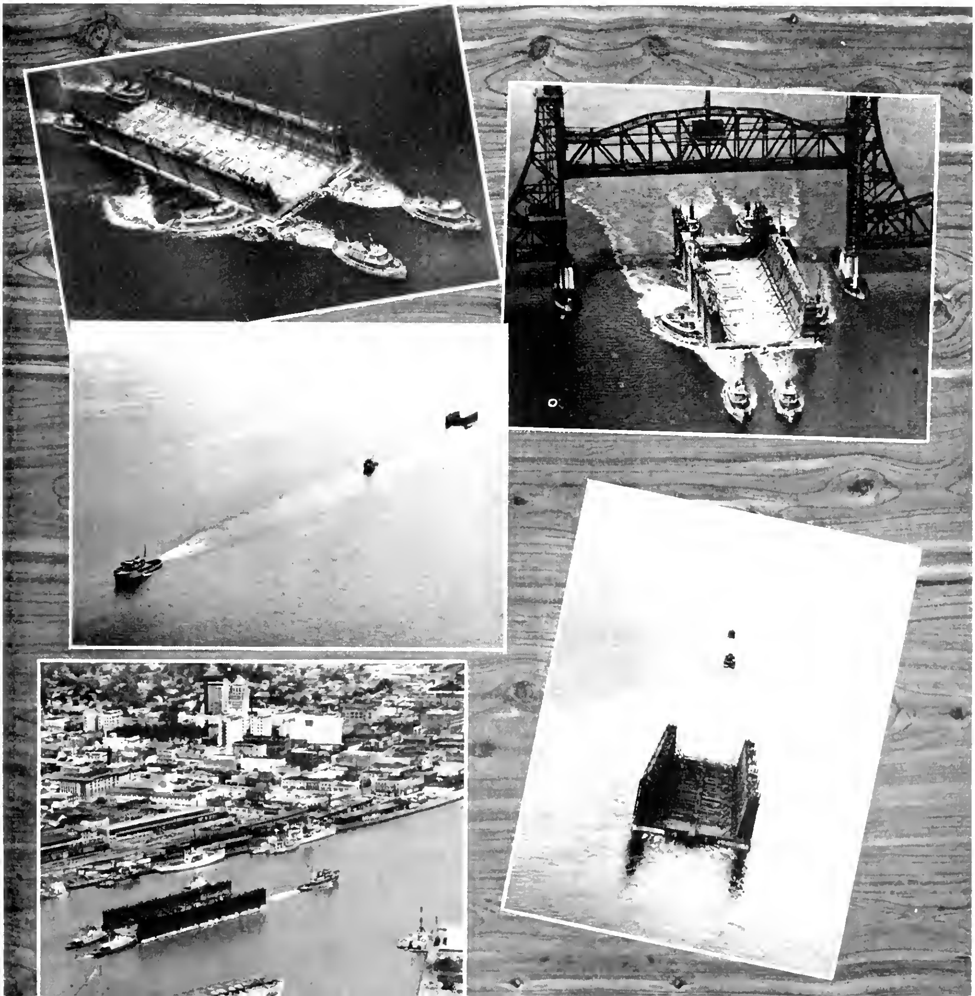
We, at San Pedro Yard, are not limited in our experience to tanker repairs, although it comprises the bulk of our work. We find that freighters and passenger vessels present difficulties and hazards of their own peculiar nature. An example of fire hazard was presented to us in the case of the French liner *Wisconsin*. This vessel had been tied up in San Pedro following the fall of France and was secured at the old Southern Pacific Wharf. The Coast Guard had insisted that the ship maintain pressure on her fire lines at all times and accordingly, several hoses had been connected to the city's main. After America entered the war, the vessel was requisitioned and work was started to convert her into a transport. Bethlehem was given the order and the ship was placed in our Yard. This was some time following the *Normandie* fire and, needless to say, we were very apprehensive as to the possibilities of fire on the *Wisconsin*. For the first few weeks, our work progressed normally. It was when burning and welding was started around the after hatch that we experienced a flare up in the lower hold. The fire was extinguished in short order only to be followed approximately eighteen hours later by another fire. A thorough investigation of the hold was made and upon lifting the tank top ceiling we found that powdered nitrate, which was carried as a cargo at some time previously, had filtered between the

(Please turn to page 89)

1,700-Mile Tow

Seven Moran Towing & Transportation Co. tugs ease an 8,500-ton floating drydock through the draw of a Pennsylvania-Lehigh Valley Railroad mainline bridge across Newark Bay, en route to tide-water from the Federal Shipbuilding & Drydock Co. yard at Kearny, N. J., on the Hackensack River. In the Narrows, between Upper and Lower New York Harbor, two 1,900-horsepower Diesel-electric sea tugs, the Gay Moran and the Marion Moran, took over the tow (tandem style) for the long coastwise haul. This drydock, 386 feet long and 110 feet wide, drawing 14 feet, has been acquired by the Waterman Steamship Corporation for use in connection with an extensive vessel reconversion and maintenance program at its subsidiary Gulf Shipbuilding Corporation plant at Chicasaw, Ala., six miles north of Mobile. The tow, which got under way July 12, was expected to take about three weeks, and actually took nineteen days.

The two top pictures show the start of the tow; left center and lower right, tugs and tow fifteen miles southeast of Miami, Fla., Sunday, July 25; and bottom left, the tow arriving in Mobile, Ala. Tug-in-charge, the Gay Moran, is being assisted up the Mobile River by two tugs of the Waterman Steamship Company.



C. P. Snively

--With The

Port Engineer of the Month

LOS ANGELES

C. P. SNIVELY

of American Pacific Steamship Company

During World War 1 Snively joined active Naval Reserve, getting in 19 months service, and paid off as Fireman First Class—oil and coal. Shipped as a water tender on the maiden voyage of the steamship *West Calumb*, built at Los Angeles Shipbuilding and Drydock Company, and remained on her with United American Lines of New York for thirteen months. Sailed with Pacific Mail Steamship Company in one of their round-the-world freighters and during the seven month trip walked approximately three times around the world making twenty minute rounds on the little high (?) speed HOR T. E. engine.

During the next two years sailed out of the East Coast with Baltimore Steamship Company and Baltimore Puerto Rico Line. In the latter outfit one trip found Snively the only English speaking member of the Dan Hanlon built *Governor John Lind* unlicensed engine gang. Vocabulary got a push at that time; could be the mustache idea was born about then.

Joined the General Petroleum fleet in 1923, at the time the *Hammac* was made into the *Emidio*. Received second assistant's license in 1923 and sailed as Third and Second on the *Emidio*, Second for a year with Bill Hassenfus and Jack Dodd on the *Lebec*, and first assistant with Ernie Johnson on the *Tejon* for another year during which "Uncle" Ray Jones tried to pound some sense into this budding marine engineer.

Left General Petroleum in May 1926 and during the next year received Joseph Moody's signature on a Chief's ticket which now has a few cobwebs on it, but is still usable.

From 1926 to 1936 shops, shipyards and various steamship operators footed the grocery bills, with Richfield Oil being the last three-year sponsor.

Swallowed the anchor in November 1936, got married to the one and only Mrs. and opened a refrigeration service business which was O. K. until the middle of

Top: Dan Dobler (left) and Lloyd Oye, guest speaker for the August meeting of the Los Angeles-Long Beach Society.

Center and bottom: Miscellaneous shots of satisfied members stuffing themselves with steak.

Port Engineers -

'42 when up came the hook.

Took two Libertys out of Calship for proposed round-the-world voyages and the first one was doing fine until July 7, 1943 when the guy we were trying to beat got in a Sunday punch at 1 A. M. and decisioned us for eight out of a sixteen ship convoy off the hump of Brazil, so the gatherings of twenty-five years were finally disposed of, much to the relief of Mrs. S.

In April 1944 Hamp Neergaard of Burns Steamship Company took me on as his assistant and I remained there until October 1946, gradually turning into a landlubber again.

An opportunity was presented in April 1947 to join the staff of American Pacific Steamship Company where the subject of this article was made acquainted with the difference between a T2 and T for two.

Hobbies—fishing, if the ends of the cans are not bulged, and hunting.

(Guess who wrote this?)

Los Angeles-Long Beach Meeting

A thirty-minute film on magnaflux operations, showing various applications of magnaflux in the marine field, was presented at the August 4 meeting of the Los Angeles-Long Beach Society of Port Engineers by Lloyd J. Oye, West Coast Manager of Magnaflux Corporation. The meeting was presided over by Dan Dobler of Texas Oil, Chairman of the Board and acting chairman for the evening.

Application and Performance of Bottom Paints

By ARTHUR WARD

At the August meeting of the San Francisco Society of Port Engineers, Arthur Ward, president of International Paint Co., Inc., spoke frankly about the problems of hull painting and illustrated his talk with slides.

Following the scheduled discussion the members engaged in a spirited discussion of paint in general and of ship painting in particular, and this discussion was participated in by representatives of other paint companies. These included, in addition to Messrs. Ward, Horton and Wrigley of International, Blanch of American Marine, Jackson of De Boom, Lukens of Federal, and Dannenfelser of Manning-Mitchell.

Mr. Ward's address follows:

ALTHOUGH the title of this paper is the application and performance of bottom paints, later I am going to say a few words about preparation of surface before application of bottom compositions and other mariine coatings.

Since the war's end, there has been an epidemic among shipping men to try out new developments in bottom compositions. I refer in particular to the so-called plastic bottom paints. The contagion which started the epidemic resulted mainly from the Navy's cold and hot plastic bottom paints. These coatings, and in particular the hot plastic, were undoubtedly of great value to our Navy during the war, but it remained to be proved that they could be used with success in the peace-time commercial operation of ships.

I would like to contrast these plastic coatings with conventional bottom paints.

An efficient plastic job entails costly sandblasting and painting under ideal weather conditions. These coatings generally are supersensitive to dampness either of the

(Please turn to page 69)

Arthur Ward, speaking before the San Francisco Society.

Left to right: George Horton, Arthur Ward and Harold Wrigley.

Engineer of the Month—George Barr

George Barr

George Barr was born in Paisley, Scotland, some time before the turn of the century. He learned his Marine Engineering by stiff competition in the apprentice system and finished his apprenticeship during a time when the market was glutted with licensed engineers. The only immediate prospect for Juniors was to sign on for foreign service. George signed on for four years with the British India Steam Navigation Company and spent his time sailing "somewhere East of the Suez." On return to the homeland he procured a Chief's ticket and a marriage license; thus he forsook his first love and started out for the New World in 1907. His first job was with Fletcher in Hoboken working on the *Harvard* and *Yale* but life in Hoboken was too much of a change from life in the Orient so he found a job in Schenectady, N. Y., a little community, far removed, where young couples could establish a home and settle down to their mission.

George worked through different stages of advancement in the Turbine Department of the General Electric Company and saw the evolution of turbine design, the introduction of gear propulsion and electric drive. He supervised the building of the first reduction gear sets and the electric drive equipment for the collier *U.S.S. Jupiter* but his chief work was in erecting and testing central station turbine generators.

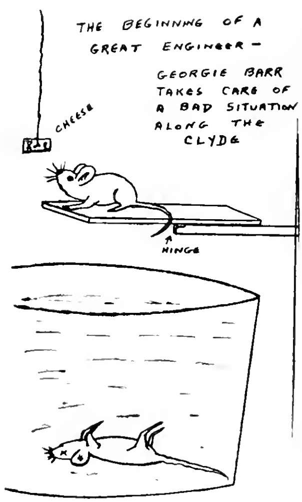
In 1918 he was transferred to San Francisco to supervise installation of machinery on 46 destroyers, which were built at the Union Iron Works. Between the two wars his time was equally divided between land and marine installation but at the commencement of the last shipbuilding program he was assigned to carry out marine installations and repairs, completing the program in 1946.

His present status is consultant in Marine activities.

His greatest relaxation is to lie in a hammock and supervise the cutting of his lawn.

But he has a hobby that is bringing him fame comparable to that of his engineering work. Throwing a colored photograph on a wall on canvas, George matches the colors in paint and comes up with a picture that the great masters would covet. Who but a Scot would develop a hobby like that one? Who but a Scot would use only two r's in his name when most people think there are four?

Words of praise almost beyond number have come to George Barr but he has also been the recipient of special awards. In 1946 he received a Coffin Award from the General Electric Company and in 1948 the Navy Commendation of Merit for his contribution to the war effort.



Application and Performance of Bottom Paints

(Continued from page 67)

plating or the atmosphere. It is a well-known fact that thick paint films, whether hot applied or otherwise, are definitely more susceptible to cracking than the relatively thinner films of ordinary bottom paints. This is proven by the fact that almost every plastic job which has been applied one, two, or three years ago and which I have examined on the bottoms of commercial ships is badly cracked down to bare metal, and in many cases serious detachment and corrosion of the plating has been in evidence. In many of these cases the owners have found it necessary to completely remove the plastic by sandblasting and to recoat with conventional compositions.

Early in the game, we were led to believe these plastic coatings could be applied over old conventional bottom compositions without sandblasting. If when applied to sandblasted plating during ideal weather, and sometimes under careful supervision of our Naval men, these coatings crack and detach within two or three years, what is to be expected of their application under commercial drydocking conditions when the old orthodox coating is merely cleaned in the conventional manner?

Further, the repeated coatings of a ship's hull with these plastics, is bound to build up a film thickness where cracking and detachment will be accelerated, especially after a few drydockings, and with the resulting exposure to atmosphere. You will then be back with another sandblasting job involving heavy cost and ship's time.

Now, I have talked about the tendency of these plastics to crack and detach. Let us consider the matter of fouling growth. I seriously question whether more than a fraction of one per cent of all ships in commercial operation which are bottom painted with conventional compositions need that painting because of existing fouling growth or, for that matter, corrosion. They drydock for other reasons.

We have been told that plastic bottom paints will keep a ship free of fouling for periods up to three years, yet I have seen many ships on drydock, coated with plastics that have been laid up in Suisun Bay for periods of only a few months, and they have been encrusted with every form of animal and vegetable life that grows in that water. You would need a micrometer to test the difference in diameter of barnacles that grow on the plastic in contrast with those which would have grown on a conventional antifouling paint, if subjected to the same conditions.

Now, let us consider conventional bottom paints. They are designed to be easy to apply by brush or spray, under almost any weather conditions, and at an economical cost. They afford resistance to corrosion and fouling for a greater period than the average out-of-drydock period of a ship in commercial operation.

Conventional bottom compositions, under normal circumstances, should not require a sandblasting job in less than twenty years on a freighter, and perhaps ten years on a tanker.

I have read through the detailed painting reports of well over a thousand ocean-going ships which have drydocked in the United States, and which have been bottom-coated with conventional compositions. I venture to say some 20 per cent of these ships are bottom-painted in the rain, or during freezing temperatures, or during intense humidity, or with sweating tanks; yet in the aggregate resistance to corrosion and fouling remains excellent.

Unquestionably, one reason shipping men are experiment-minded is because during and after the war, the shipyards did not have the skilled painters nor the number of men that they previously employed. Further, the bottoms of these wartime-built ships, while on the builders' ways, and subsequently, were never given the attention that would have been accorded them in peace-time. The result has been a multitude of rusty hulls, which are only now being brought up to a state of proper preservation.

My company has spent many years in an endeavor to develop a so-called plastic bottom paint which will not crack upon repeated recoating and extended exposure to the atmosphere while on drydock. I am able to tell you that developments along these lines are encouraging, but we do not intend to offer ship owners a coating which will have to be removed by sandblasting or scaling within a few years of application.

I cannot too strongly emphasize the necessity for proper cleaning of ships' bottoms before application of bottom paints. The shipyards are doing the best job possible in face of unskilled help, shortage of men, and labor conditions. If and when these conditions are overcome, there should be a pronounced improvement in both preservation and resistance to fouling. Along these lines, my company is experimenting with a roller shaped air-driven wire brush with flat spring steel wires, to be operated on a light tubular handle, from the dock bottom. These brushes, of which some ten or twelve were built by my company many years ago, performed a most effective cleaning job by removing all semblance of fouling and corrosion without harming the good adhering paint. In addition, they removed the high spots on the surface of the paint, and which grow in size at every ensuing painting resulting in rough, scaly hulls and increased water friction. However, we were forced to discard these brushes as, although we used the finest tempered spring steel mounted in a vulcanized rubber shaft, the wires eventually crystalized and broke.

I have examined the results of cleaning ships' bottoms by dry sand-sweeping and sand-washing. These means are, of course, in general an improvement and very much faster than present day methods of cleaning bottoms. However, I found, in some instances, the sand had removed well-adhering paint down to bare metal, and in other cases had noticeably eroded the surface of the paint, but what these methods do not accomplish is the evening up of the high spots on the paint, as is done by the use of proper scrapers or a mechanical brush such as I have described.

Reverting to the power driven roller-shaped brush, more recent developments have disclosed a method

(Please turn to page 88)

Low Temperature Air Conditioning For Perishable Cargoes on Ships

(Continued from August issue)

By JOHN F. KOOISTRA

There are a number of factors which offset the air leaving temperature and should be taken into account when the plant is originally designed. In the following pages we will attempt to explain these.

It is assumed that the readers of this article are familiar with the psychrometric chart, and therefore we will not devote any time to its theory or its development, except to say that this chart is the basis of all studies in air conditioning work. It was first developed in 1911 by Willis H. Carrier, one of the founders of and now chairman of the board of directors of Carrier Corporation. Although originally developed for a range of temperatures from 35°F to 100°F, we now have available for our use a high temperature (range 60°F to 125°F), a medium temperature (range 35°F to 90°F), and a low temperature (range —20°F to 45°F) psychrometric chart. The latter is shown in Fig. No. 2.

To enable us to understand the relationship between room dewpoint and apparatus dewpoint, as well as the effect of coil design upon the differential between apparatus dewpoint and leaving air temperature, we should define the following commonly used terms, all of which apply to air conditioning, whether for human comfort, for industrial processes or for low temperature refrigeration applications.

Sensible heat.

Sensible heat is the heat added to or subtracted from a substance causing an increase or decrease in temperature without causing a change of state. This heat is perceptible on the thermometer.

Latent heat.

When a temperature is reached at which heat added or subtracted does not cause a further change in temperature (as at the boiling or freezing points), a change in state takes place upon further addition or subtraction of heat. The heat necessary to change the state of a substance *with temperature remaining constant* is called "latent heat." This heat cannot be measured with a thermometer.

Total heat.

Total heat represents the sum of sensible and latent heat of a substance.

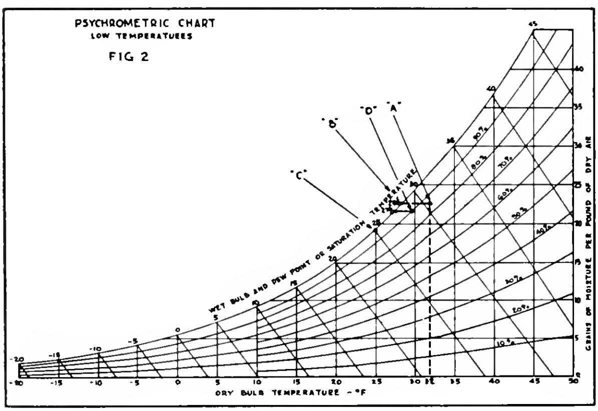
Sensible heat factor.

This is the ratio of sensible heat and total heat of a substance. When sensible heat and total heat are the same, this factor is unity. For all substances which contain moisture the sensible heat factor is less than unity.

Dewpoint

Air always contains a limited amount of moisture which is expressed in percentage of humidity. When the air is saturated with moisture, the percentage or relative humidity is 100%. This temperature is called "dewpoint." It is of interest to mention that the capacity of

(Please turn to page 104)



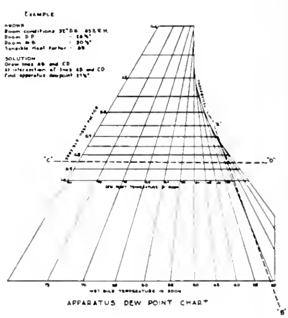


FIG-3

On the Ways

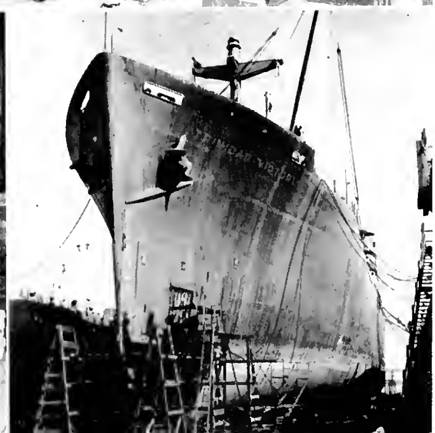
New Construction — Reconditioning — Repairs

A Victory for China—Another First for Bethlehem

The San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division, has just chalked up another "first" on its scoreboard of successfully accomplishing the difficult or unusual in ship repair and conversion. In just seven working days the yard completely replaced a damaged bow casting on a Victory Ship with a fabricated stem weldment. This is the first time such an all-welded steel replacement has been made and installed on this type of vessel. An indication of the speed with which this job was performed is seen in the fact that to prepare the patterns and cast the section would have taken as long as sixty days.

The vessel on which this unusual job was performed is the *Trinidad Victory*, recently renamed the *Chunking*

Upper left: Picture shows how the bow casting was completely destroyed on the Trinidad Victory. Some of the damage to the bottom shell plates is also visible.
Upper right: In this picture the new bow section has been erected, damage to the bottom shell plates has been repaired, and the ship is now ready for the water.
Lower left: The fabricated stem section is shown here prior to being placed in the stress relieving furnace.
Lower right: A general view of the Trinidad Victory on drydock, showing repair operations in progress.



Victory following her sale to the National Government of China by the U. S. Maritime Commission.

The vessel was commissioned in September 1945, at the California Shipbuilding Company in Los Angeles and placed in operation by the Marine Transport Line between Pacific Coast ports, Korea, Japan and Alaska. In September 1946, while running at 17 knots in a fog off the tip of Adak Island, the *Chunking Victory* ran aground. The bow casting was completely destroyed along with plating and internals in way of the bow and No. 1 and No. 2 double bottoms.

Following the accident, the Chunking Victory made San Francisco under her own power and was drydocked for survey. Because of the extensive repairs that would have had to be made, the Maritime Commission laid the vessel up at Suisun Bay. In June of this year, however, she was redocked and surveyed by prospective buyers from the Chinese government.

At that time V. A. Christensen, Structural Foreman at the Bethlehem Yard, stated that the main factors in getting the ship back in service were repairs to the ripped bottom and the problem of getting a new stem casting. It was called to the attention of the new owners, as well as the American Bureau of Shipping, that making patterns for and casting a new stem of the required size would probably take thirty to sixty days longer than it would to fabricate the section out of plate and weld it together by electric welding.

The decision was made to fabricate the stem. The Yard's draftsmen drew up a set of plans which were rushed to the ABS in New York for approval. On July 19 the yard was authorized to proceed with repairs as outlined in the blueprints. That same day the ship was drydocked and repairs to the bottom damage and fabrication of the stem weldment were started.

In just seven working days the new stem weldment was lofted, fabricated, welded, stress relieved, checked for alignment and erected in place on the ship.

The steel plating used in this weldment was 1½″ and 2″ thick, and it is interesting to note that 650 pounds of welding electrode, of which 5/16″ was the predominate size, was deposited during the process of welding.

The tailshaft was hauled for inspection and reinstalled. A new spare tailshaft was manufactured by the yard and stowed aboard the vessel.

Besides renewing, cropping or fairing in place of the damaged bottom shell plates, as well as fabricating the new stem section, Bethlehem's job was to put the *Chunking Victory* in operating condition. This included opening up turbines, boilers and reduction gears for survey and chemically cleaning boilers, piping and the lube oil system, along with completely rigging the vessel. In addition, necessary miscellaneous repairs were made to put the vessel into class.

The Castle Line on the West Coast

There are many facets to the maritime industry, and foreign steamship lines operating in American ports have a place which is often overlooked or decried. There is not sufficient appreciation of the part that foreign lines play in the intricate affairs of shipping, when "shipping" is regarded as merely including the operation of American ships. Shipping goes far beyond that and includes ship building, ship servicing, ship repair, ship loading and unloading, ship traffic, ship importing and exporting, ship insuring and ship financing. There is also the matter of ship office rentals, and office employment, and pier rental, and the purchasing of equipment and supplies, and taxes. So competitive foreign lines represent a very important element in maritime activities and in the benefits to port cities, without which such cities would suffer considerably. The West Coast of the United States is attracting many ships of foreign registry and offices of many foreign companies. Some of the latter are represented by American operating agents.

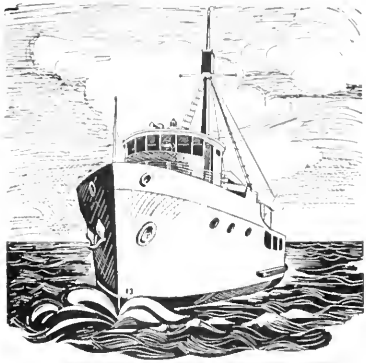
The Castle Line and Olympic Steamship Company

The Castle Line has operated a regular service from New York to the Far East since prior to the turn of the century, and was the first company to maintain a regular service on this route through the Panama Canal. Agents

(Please turn to page 97)

The Muncaster Castle

Coast Commercial Craft



The Peter W.

LSM to River Towboat

The Western Transportation Co. of Portland, Oregon, has just completed what is believed to be the first, and so far the only, conversion of a Navy LSM to a river towboat.

The vessel, the *Peter W.*, was cut down 104 feet and 45 feet of new ship shape bow with towing knees was added, making completed tug 145 feet overall.

The original engine room containing two 1800 H.P. opposed piston Fairbanks-Morse engines was retained intact with all auxiliaries.

A 5 H.P. Sperry steering gear from a PC type vessel was used to replace the two and one-half HP steering engine originally in the LSM. The larger engine permitted installation of monkey rudders forward of the wheel which have area equal to main rudders and aid materially in backing and flanking.

Trial run May 24 proved vessel to have speed of 13 knots running light.

All new quarters were built with showers and lavatories on each deck. A large lounge and recreation room is on forward main deck. Ship is equipped with ship-to-shore 'phone, hand set 'phones in pilot house, engine room, and all officers' rooms, and a public address system.

The two capstans aft and the three forward ones are electrically operated. The auxiliaries include two 100 K.W. generators for this purpose.

Steering is wheel controlled, electrically or trick stand controlled, with an emergency hand control.

Rex Gault, president of The Western Transportation Co., named the boat for his son, Peter. Peter really enjoyed the trial trip but his big thrill came when he found in the galley a cake modeled to an exact replica of the Peter W. which he is admiring in this picture.

The Frances, flagship of three Columbia River fleets. It will operate as a survey vessel and personal yacht for President Leppaluoto, of Inland Navigation Company, Upper Columbia River Towing Company and Columbia-Snake River Towing Company.

Captain "Slim" and Mrs. Frances Leppaluoto topside on the Frances. Stack insignia is that of Leppaluoto's Columbia River Towing Fleet.

The Frances — — A Tug Owner's Yacht

Lake sailors may fail to appreciate some of her fine points, but to Cap'n "Slim" A. Leppaluoto of Inland Navigation Company the *Frances* is nonetheless a yacht. Most commercial operators will agree she is just the ticket for an owner's "command" ship, particularly for Slim's home waters, the swirling waters of the upper Columbia. She should be at home in these 10-12 mile currents for she has been picked to match the performance of the "world's largest horsepower tug fleets"; the *Frances* is powered by twin Atlas model 6 HM 1558s, developing 320 each on an 11½-inch bore and 15-inch stroke. She is a former 114-foot Army FS, built by Petrich (Western Boat Building), Tacoma, and revised to Slim's requirements for a survey vessel and possible future tug, but maintaining ample quarters for ten adult guests.

The *Frances* is of heavy wood construction, the thickness of which is testified by installation crews of Pacific Marine Supply who had to drill through two feet of bottom to install her new Bendix Depth Recorder. Other new electronic equipment includes an Intervox 65-watt 10-channel radio telephone and a Mackay radio direction finder. Flanking the two Atlases below, are two 6-cylinder Hercules 20-KW diesel generator sets.

After a shakedown cruise to Alaska, the *Frances* will join the fleets of Inland Navigation, Upper Columbia River Towing, and Columbia-Snake River Towing Companies, headed by Leppaluoto, and headquartered at The Dalles, Oregon. From there they run up to Pasco and Hanford, Washington, and, sixty days a year, all the way up the Snake River to Lewiston, Idaho. In connection with the latter, Congress has recently authorized five dams which would make this stretch navigable all year.

Roomy pilot house of the Frances has Mackay Radio Direction Finder over charts (left), a new Bendix 400 ft., 400 fathom Supersonic Depth Recorder, 65 watt Intervox Radiotelephone and an amplifier for radio-record playing and the loud-hailer.

Twin Atlas Diesels of Frances. Vessel also has twin Diesel generating sets.

Pacific WORLD TRADE
Reg. U. S. Pat. Off.

George Schmitz New Jr. World Trade Association President

In the election of George Schmitz as president of the Junior World Trade Association of San Francisco, Wells Fargo Bank and Union Trust Company's foreign department gains an unusual distinction. For the senior World Trade Association also is presided over by a Wells Fargo man, W. J. Gilstrap, manager of the foreign department.

Heading up the Junior Association requires a steady hand and head for it is composed of the livest group in the industry. George is just the man for the job, and he already has plans laid out for a busy term. Committee appointments are listed below.

Born and educated on the "continent" side of San Francisco Bay, Mr. Schmitz in 1933 became a banker—in a small way. That was fifteen years ago, and he is still a banker. The foreign department is proud of him and of his popularity in world trade circles. But if you ask George about *his* pride and joy, he will start talking about his four-month-old twins (b. and g.) and will swing into a discussion of his other two children (also b. and g.). A major regret is that we were not around about the times George was passing out cigars. (Herb Porter came through, George.)

Oh yes, those committees:

Membership, Jack M. Weese, Funch Edye & Company; Auditing and Finance, Thomas B. Shaw, Bank of California; Education and Speakers, Charles M. Freeman, Tidewater Associated Oil Company; Public Relations, Robert H. Langner, San Francisco Chamber of Commerce; Social Affairs, Reno Franceschi, Getz Brothers & Company; Attendance and Reception, Joseph A. Wagstaff, S & W Fine Foods; Program, Charles M. Freeman; Roster, Francis Novitsky, American President Lines; editor of the "Ship's Bell", the Association's publication, Bruce A. McLelland, Frazar and Hansen, Ltd.

George Schmitz

"Tourist expenditures in Canada totalled about $242,-000,000 in 1947, of which all but $12,000,000 was by United States nationals. Only sales of newsprint surpassed travel expenditures as a source of United States dollar revenues."

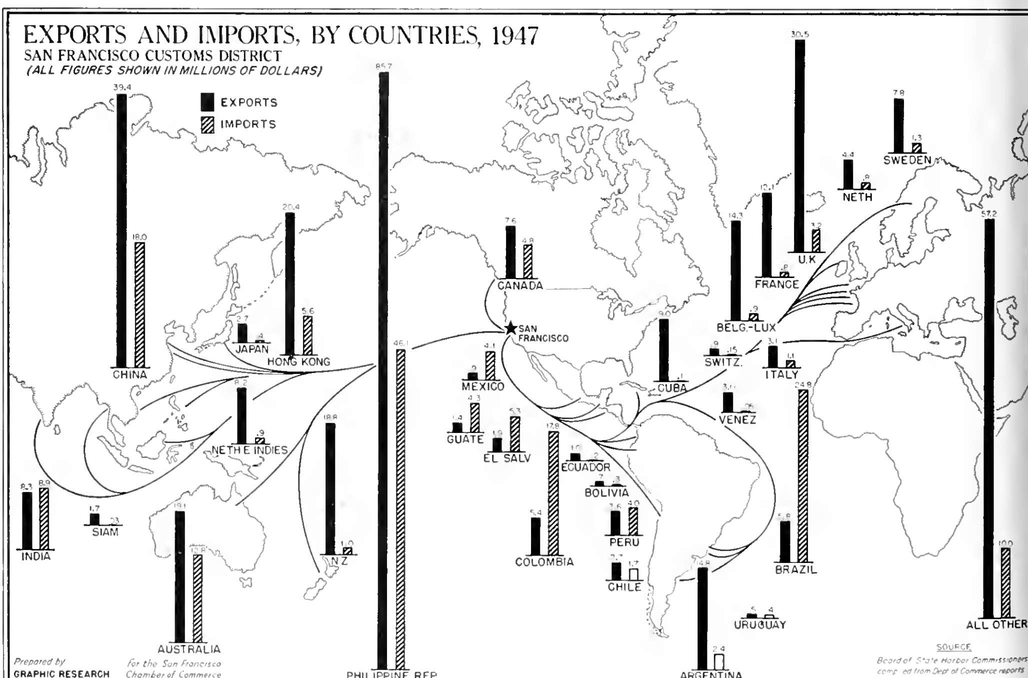
Gift From Montevideo To Montevideo

Simon J. Cosulich (left), manager of Moore-McCormack Lines' South American Bill of Lading Department in the New York office, and Robert Richling, Uruguayan Consul in New York City, inspect the case from Mayor H. A. Larson of Montevideo, Minnesota, to Mayor German Barbato of Montevideo, Uruguay. The photograph was taken on Moore-McCormack's Pier 32, North River, New York, prior to the loading of the case aboard the company's Good Neighbor liner Argentina.

Materials from twenty-three States and Alaska and Hawaii as well, were shipped recently aboard the Moore-McCormack liner *Argentina* to Mayor German Barbato of Montevideo, the capital city of Uruguay, to be exhibited in his city. Robert Richling, Uruguayan consul, attended the loading of the shipment.

The shipment, the gift of Mayor H. A. Larson, of Montevideo, Minnesota, was made in response to the gesture of the Uruguayan mayor who sent a plaque and Uruguayan seedlings to the Minnesota city during a recent fiesta.

The shipment, as delivered to the *Argentina* by the International Expediters, Inc., freight forwarders, weighed 495 pounds and included the following:—rice, shelled and on the stock, from Louisiana; Michigan cherries, Alaska salmon and crab meat, North Dakota flour, Rhode Island woolen samples, Colorado stone, South Carolina clothing, West Virginia pottery, Oregon pine and myrtle wood, Florida fruit juice, Alabama peanut butter and peanut oil, Tennessee honey, Minnesota flour, Arizona stone and minerals, Hawaiian pineapple, Washington plyboard, and maps and booklets from New York, Maryland, New Jersey, South Dakota, Missouri, Idaho and Iowa and the flag of the State of Utah.



Marine Insurance

The London Letter

By Our United Kingdom Correspondent

Report of United Kingdom Mutual Steam Ship Assurance Association

AN INTERESTING feature of the annual report of the United Kingdom Mutual Steam Ship Assurance Association, Limited (Messrs. Thos. R. Miller & Son, London, managers), is that the Government ownership or operation of tonnage has not usually meant that P. & I. cover is considered unnecessary, but rather the reverse. Eleven different Governments, including those of the United Kingdom and U.S.A., have entered ships in the Club. The Canadian Government was given a full cover for its entire wartime fleet of 170 large vessels. Moreover, the managers were asked to advise the British, American and Netherlands Governments on P. & I. matters, and recently they have been rendering special assistance to the Treasury Solicitor with the 300 life claims arising out of the tragic collision between the *Queen Mary* and H.M.S. *Curacao*.

Fog, Messrs. Miller state, is still the main cause of collisions, but most of such accidents "could be avoided if the Collision Regulations were more strictly observed." The "moderate speed" referred to in Article 16 of the Regulations may in bad conditions mean only steerage way or even stop, the Courts have held. It is equally important to stop the engines on hearing a whistle before the beam, and to give no helm orders until the other ship is seen. Ships today are expensive to run and their time is valuable. But one Captain who tried to save a tide on a misty night put his ship in dry dock for six weeks, while his owners also had to pay the value of a trawler and compensation to the widows and children of ten fishermen.

Modern navigation devices, the report points out, are no substitute for a good lookout. The Association is concerned in a bad collision involving a Canadian destroyer and a cargo vessel. The case is sub judice at present, but evidence was given at the Court of Inquiry to the effect that the destroyer was navigating in fog at some 25 knots, relying on her radar, and the cargo ship either did not show up on the radar scan or was not reported to the bridge. Incidentally, it is a common practice not to post a lookout on the forecastle head in bad visibility conditions. This has been much criticised by American judges. Masters should "only withdraw the lookout from forward if satisfied that conditions give a better view from the bridge."

Chamber of Shipping Representatives on Committee of Lloyd's Register

For the first time since its inception, 70 years ago, the Chamber of Shipping of the United Kingdom has been invited by Lloyd's Register of Shipping to nominate three representatives to serve on the general committee of the Register. This is apart from the direct representation of shipowners in the different ports. The council of the Chamber of Shipping have unanimously agreed to accept the invitation. Of the three representatives now appointed, one is associated with tramp shipping, one is a liner owner, and the third is interested in the coasting and short sea trades and the operation of small tankers.

"Chartered Shipbroker" Interpretation

Mr. W. H. Vetnall, presiding at the annual meeting (held at the Baltic Exchange, London) of the Chartered

(Please turn to page 87)

NEWS FLASHES

NAVY CONSTRUCTION AND REPAIR PROGRAM

For detailed list of Naval vessels in this program see pages 52 and 53, this issue.

* * * * *

MARITIME COMMISSION TANKER PROGRAM

The so-called Navy tankers, 660 feet long, 20,000 horsepower, single unit, single shaft, 30,000 tons, will be awarded to private shipyards by the Maritime Commission after opening of bids on September 10. Present program calls for twenty ships and there is some hope that Pacific Coast yards will participate.

* * * * *

DOLLAR DECISION

Decision in the case of Dollar against the Maritime Commission for control of the American President Lines is expected to be handed down by Federal Judge Matthew McGuire in Washington about October 1.

* * * * *

EVERETT PACIFIC AWARDED C-2 CONVERSION

The former troopship Young America will be reconverted to a C-2 cargo vessel by Everett Pacific Shipbuilding and Drydock Company. The reconversion job is for the account of the Maritime Commision and the Waterman Steamship Corporation and involves nearly half a million dollare. The vessel was towed to Everett from the Suisun Bay reserve fleet by the Crowley Launch and Tugboat Company.

* * * * *

MARITIME COMMISSION OFFERS FOURTEEN VESSSELS

Fourteen N3-M-A1 single screw diesel driven propulsion aft vessels are offered for sale by the Maritime Commission. Four are at Wilmington, North Carolina, reserve fleet is at Suisun Bay, California; and four in the James River. General specifications are: length--269 ft. 10 in.; beam--42 ft. 6 in.; draft--20 ft. 9 in.; speed--10¼ knots.

CONVERTING LIBERTY SHIPS IN ITALY

The crowded condition of shipyards in Britain is indicated by the overflow of shipbuilding to other countries. British interests are converting about twenty coal burning Libertys, built at Richmond, California, to passenger vessels with 3900 horsepower Fiat Diesels.

Last month we reported tanker construction in Japan. This also involves British interests.

* * * * *

NAVY'S HOT AND COLD PLASTIC COATINGS

John Parker, president of the American Marine Paint Company, announces that the company has obtained exclusive property rights for supplying private industry with the United States Navy's highly successful hot and cold plastic underwater coatings.

* * * * *

SUPER TANKER PROGRAM

The private shipyards of the United States have on order or under construction a total of 61 tankers as of Sept. 2, 52 of which are so-called super-tankers.

The super-tankers will exceed 600 feet in overall length which is more than 100 feet longer than the typical T-2 tanker and 187 feet longer than a Liberty ship. The super-tankers will have a beam of 82 to 84 feet compared with the present T-2 tanker's beam of 68 feet and the draft, loaded, will be 31 to 33 feet as compared with the T-2's 30 feet.

The super-tankers will approximate 26,000 to 28,000 deadweight tons as compared with the 16,613 deadweight tons of the typical T-2 tanker and will carry 228,000 to 240,000 barrels of oil as against 141,000 barrels for the T-2 tanker capacity.

* * * * *

BETHELEHEM SPARROWS POINT YARD INCREASING TANKER ORDERS TO TWENTY-TWO

Contracts recently awarded for the construction of eighteen additional large oil tankers at the Bethlehem-Sparrows Point Shipyard have increased the current tanker construction program to twenty-two ships totaling 530,000 deadweight tons.

The vessels have a contract valuation of approximately $110,000,000. Their construction will require adding more than 1,000 new employees to the 3,000 now on the Sparrows Point Yard payroll and will keep the Yard busy through 1950.

Bethlehem's Quincy Yard also has tanker contracts. As of Sept. 1, these contracts totalled 18.

TODD GETS $600,000 CONVERSION

Todd Shipyard Corporation in Seattle has a $600,000 contract for the conversion of the former Naval transport Hotspur.

The Hotspur will be converted back to a standard C-2 cargo carrier. She is among ten vessels on the coast which are to be converted for Waterman Steamship Company.

* * * * *

SUN'S TANKER ORDERS

Sun Shipbuilding and Drydock Company had fifteen giant tankers on order on September 1.

* * * * *

NEWPORT NEWS TANKERS

Newport News Shipbuilding and Drydock Company had eleven giant tankers on order on September 1.

* * * * *

BETHLEHEM GETS AMERICAN EXPORT LINES ORDER

The Shipbuilding Division of Bethlehem Steel Company has a contract for two new 20,000 gross ton American Export liners at $23,415,000 each. The ships are to be 683 ft. long and carry 972 passengers at a 25 knot speed.

* * * * *

NEW YORK SHIPBUILDING GETS AMERICAN PRESIDENT LINES ORDER

The New York Shipbuilding Company, Camden, N. J., was awarded the contract for the construction of three V-2000 round-the-world vessels for American President Lines, San Francisco The ships are to be 536 ft. long and carry 228 passengers. Price is $10,671,000 each.

* * * * *

FOREIGN SHIP CONSTRUCTION

As of July 1, Great Britain was constructing 94 passenger and passenger cargo ships plus 457 of other types. Belgium, Canada, Denmark, France, Holland, Italy, Norway, Spain and Sweden were building 78 passenger and passenger cargo vessels plus 505 of other types.

* * * * *

CONSTRUCTION AND EXPANSION

Union Oil Company's expansion and modernization of their packing and compounding plant at Oleum, California, is well under way at an estimated cost of $10,000,000.

* * * * *

The San Francisco Bridge Company is moving to its new 98½ acre site in South San Francisco. This will be an expansion of their operations and the estimated cost of the move is $610,000.

* * * * *

Atlas Imperial Diesel Engine Company, Oakland, will build new $1,000,000 glass container plant at D and Winton Streets, Hayward.

Running Lights

Sevier Appointed Vice President of Matson in San Francisco

RANDOLPH SEVIER

Randolph Sevier, formerly vice president of Castle & Cooke, Matson Navigation Company's general agents in the Hawaiian Islands, has resigned that position to join Matson in San Francisco as executive vice president.

Sevier began his career with Matson in 1923 when he started as a checker on the docks at San Francisco. He served as freight clerk and purser on Matson ships from 1923 to 1926 and in the latter year became manager of the Hawaii Transportation Company in Hilo. In 1930 he joined the steamship department of Castle & Cooke and later became manager of the department. In that capacity he has been in charge of operations connected with Castle & Cooke's function as general agent for Matson in Hawaii.

Sevier was appointed vice president of Castle & Cooke in 1944 and has been president of Castle & Cooke Terminals, Ltd., and of its predecessor, Honolulu Stevedores, Ltd., since that firm was incorporated in 1936.

Under his direction the terminals, which handles approximately 90 per cent of the civilian cargo in the port of Honolulu, has become recognized as having one of the largest and most efficient stevedoring operations in the nation.

Sevier was one of the original organizers of the Hawaii Employers Council and served a term as vice president of that organization. He is a member of various civic organizations and the Pacific, Commercial, Outrigger, Propeller and Republican clubs. A native of California, he is a graduate of the University of California in Berkeley.

Conference of Diesel Engine Manufacturers' Association

The Diesel Engine Manufacturers' Association spon-ors an educational program in universities with the iope that engineering graduates will have developed a nore practical understanding of Diesel engineering than vould be possible through lectures and text. Many olleges have set up laboratories and shops to produce his practical type of training and in some of them the ngineering students have made their own equipment.

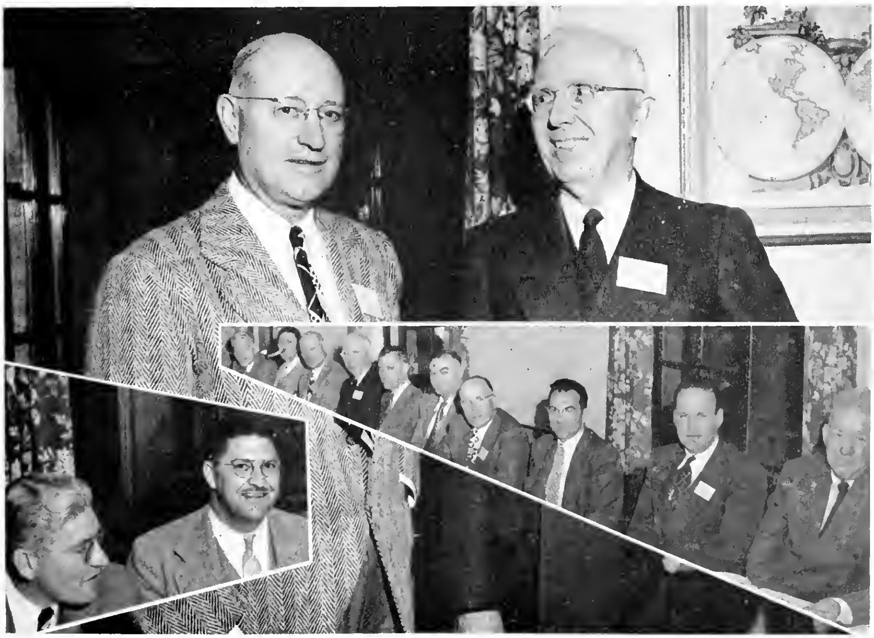
On August 16 and 17 the Association conducted its Pacific Coast Educational Conference at the University of California, Berkeley, and at the California Research Corporation laboratories at Richmond.

Meeting in the engineering building at the Univer-ity, the session was presided over by Otto H. Fischer, president of the Union Diesel Engine Company and vice president of the Association. Speaking at the session in ddition to Mr. Fischer were: Roy A. Hundley, chief ngineer, Enterprise Engine & Foundry Company, who liscussed "Making an Engineer of an Engineering Graduate"; S. W. Newell, vice president, Union Diesel Engine Company, who talked of the challenge offered young engineers by the Diesel industry; W. G. Nostrand of the Winslow Engineering Company, who spoke of the technique of filtering; and Professor Carl Vogt, who described the University of California's Diesel laboratory. The session included a visit to the University's cyclotron.

The day at Richmond afforded an opportunity for visiting one of the best equipped commercial laboratories, and the time was so well organized that all present were able to inspect, under able guides, every important part of the laboratory. Discussions were held on the relation between fuel quality and engine performance, the role of modern lubricants in Diesel operation, and Diesel engine service problems.

The entire conference, typical of many similar conferences to come, was ably managed by executive director Harvey T. Hill.

At the conference:
Harvey T. Hill, executive director, Diesel Engine Manufacturers' Association (left), and Otto H. Fischer, president, Union Diesel Engine Company.
Left inset: J. P. McArthur, left, and H. P. Henderson, both of Worthington Pump & Machinery Company.
Right inset: Left to right: J. P. McArthur, Worthington Pump & Machinery Company; H. P. Henderson, Worthington Pump & Machinery Company; Harvey T. Hill; Otto H. Fischer; Prof. Carl J. Vogt, U. C.; L. M. C. Boelter, U. C. L. A.; A. H. Batchelder, California Research Corporation; I. Cornet, U. C.; S. W Newell, vice president, Union Diesel Engine Company; E. W. Newell, father of S. W. Newell.



West Winds Inc.

Eric C. Johnson

Joseph C. Brewster

When Eric C. Johnson was sweltering in the Orient a couple of years ago, he longed for the cool west winds of San Francisco. That was when the idea for the name of his newly incorporated firm, West Winds, Inc., first took form in his mind. So when Johnson returned from the Orient he formed the new company, and actual ship repair work was started in August 1947. Since then many ships have been serviced by the firm.

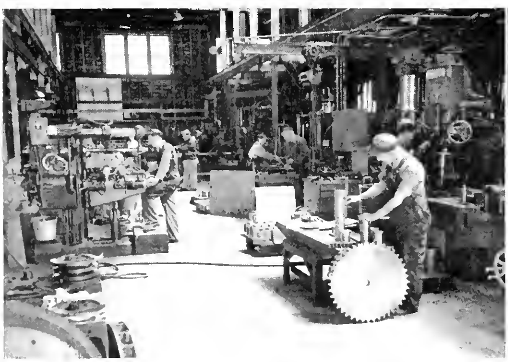
West Winds, Inc. is devoted to marine and industrial repairs. The shop and staff are equipped to complete all voyage repairs on ships other than dry docking, and their specialization is in the field of diesel engineering. Vice president and chief engineer of the firm Joseph C. Brewster recruited through the war and postwar years a staff of engineers and former chief engineers of motor ships who have a wide knowledge of foreign and domestic diesel engines. These men repair or install machinery, reset, align and re-install as may be required. The shop men repair or manufacture new parts when parts are not available from the factory.

Johnson, who is president of the company, is a licensed engineer and has been engaged in the marine repair business for the past fourteen years. As shop superintendent for a well-known West Coast firm, he gained a vast knowledge of shop procedure and technique in the manufacture and repair of machine parts. Other experience includes three years as diesel superintendent for the same firm, and a short period on the yacht *Zaca* as Chief Engineer, and on the *Lightning*, a large freighter of the Pacific Far East Line which was powered with Sun-Doxford engines.

Vice President Brewster also has wide experience in the installation and operation of marine and stationary machinery. He worked in diesel plants of Sinclair and Stanolind Oil Companies in Texas and Oklahoma, and for a number of years worked for the U. S. Government as District Manager under civil service doing construction work in Colorado under the Department of Agriculture. At the beginning of the war he was employed by Pacific Bridge Company of San Francisco where he was foreman of machinery installation for the Navy at Pearl Harbor.

His assistants are Wainel S. Bratt and Malcolm Andreasson, both of whom hold chief engineer licenses. Bratt, formerly with the U. S. Navy, was lieutenant in charge of repairs on a repair ship in the South Pacific. Andreasson, formerly chief engineer of M V *Panama* of the Johnson Line, has spent twenty years in the operation and maintenance of ship equipment, and has had many years of training in a diesel factory in Sweden.

San Francisco shop of West Winds, Inc.



Men overhauling Cleveland Diesel generator sets in the Oakland shop.

At the left—the new building.

Below—Arthur Pegg, Sr. (seated) and Arthur Pegg, Jr.

rt Pegg's New Building in San Pedro

One of the most modern marine structures in the Los ngeles Harbor area, the new building for International larine Paint and Sumco Products was recently opened y Manager Arthur Pegg in San Pedro. Conveniently ocated near the waterfront and yards, Art Pegg's new eadquarters embrace many up-to-minute features and mple warehousing facilities. Arthur Pegg, Jr., assists is father in the conduct of International and Sumco ffairs for the Pacific Southwest. Arthur Pegg, Jr., was ecently president of the San Pedro Chamber of Comnerce, and is a past president and one of the founders f the Bilge Club.

lational Defense

(Continued from page 56)

nable motor vehicles to proceed under their own power o the decks above ground level for loading or unloading vithout their being lifted to the upper levels by elevators. The latter type of operation has a tendency to slow down andling, which results in having vehicles unloaded on the ower decks and then the cargoes are transferred to the ipper decks by the use of fork lift trucks or dollies which re run into elevators and raised to the upper levels. This alls for a greater expenditure of manpower and slows he spotting of cargo on piers for loading into vessels. n a future national emergency involving actual hostilities n a global scale, it is the considered opinion that manpower may be the deciding factor. Accordingly, in the onstruction of any processing plants or transshipping acilities which have to do with our war effort, the most areful attention possible should be devoted to the planning of these facilities with a view to reducing the numer of manhours required to process or to handle after processing all essential commodities.

It is reasonable to give consideration to the possibilties of destruction of certain ports, particularly those ocated in the highly industrialized areas; and the subsequent use of the less vulnerable port facilities we are asked whether it be to the best interest of the national defense if the port operators were familiar with them, in so far as security permits; further that there be some means of coordination between the defense agencies and the ports in their relation to the national defense and the consideration of ways and means for ports to finance the necessary construction of adequate port facilities. It can be stated that planning future operations is a continuing responsibility of the general staff. Naturally all

(Please turn to page 98)

Puzzle—Find Quentin Herwig

Quentin Herwig, president of Marine Service, Inc., is a big man (6 feet, 8 inches) but get him out in the warehouse and surround him with 24,000 gallons of International paint, and he's just about lost as this picture shows. With him, left to right—he's the extreme right—are Miss Jessie Thornley, Capt. Ernest G. Heinrici, Henry Anderson, secretary of the corporation, and Miss Virginia Spauldig, secretary to Mr. Herwig.

Represented in the huge stock carried by Marine Service, Inc., are topside and interior paints along with a huge supply of bottom composition. Marine Service, Inc., is also the distributing agent for American Cordage, Bird-Anchor compounds and Gamlen chemicals.

Liberty Propeller Shaft Solutions

(Continued from page 51)

fabric belt connected to the main shafting. This pulley follows the torsional vibration of the ratating shaft. Loosely coupled to the light pulley and an integral part of the instrument is a heavy inertia mass or flywheel which rotates at a uniform speed. The relative motion between the light pulley and the inertia mass, through a linkage, actuates the pen across the moving strip of paper.

Through a medium of a pen, a clock run by battery records time on the tape in fifths of a second. The number of shaft revolutions are recorded by electric impulses, relayed from a trip, set in coordination with the ship's revolution counter.

Sea trials were conducted July 23 in the channel between San Pedro and Santa Catalina Island. Tape recordings were taken at various speeds in light and loaded conditions. At the same time, indicator cards plotting the pressures within the engine cylinders were made. These cards establish the indicated horsepower of the engine at various speeds and load conditions and in addition provide a means for balancing the engine.

Ideal conditions for wind and water prevailed throughout the sea trial and from preliminary calculations, the test was successful. The engine was operated at 76 RPM and there was no evidence of excessive torsional vibration. There was no evidence of excessive heat in No. 6 main bearing due to the increased bearing pressure from the added weight of the flywheel.

Final information regarding these tests is being formulated by the American Bureau of Shipping and the U. S. Navy and will be available after all calculations are completed.

Picture taken at the sea trial of the S. S. John Goode

Front row, left to right: Edw. G. Baker, American Bureau of Shipping, New York; J. C. Huntley, U. S. Coast Guard; H. E. Harper, Chief Engineer; Mr. Marks, U. S. Customs Office; F. B. Harper, observer; F. P. Miller, American Bureau of Shipping; G. McCarthy, U. S. Coast Guard; F. Redmond, U. S. Maritime Commission; H. H. Whitesel, World Wide Tankers, Inc.

Back row, left to right: E. Miller, Time Oil Co.; Captain Jorgensen, SS John Goode; S. Brummel, W. H. Wickersham & Co.; Geo. A. Bradford, Port Engineer, World Wide Tankers, Inc.; S. Stein, Long Beach Naval Shipyard; E. Broomall, Todd Shipyards Corporation; A. Waxman, Long Beach Naval Shipyard; R. K. English, Todd Shipyards Corporation.

Russ Miedel of Atlas Imperial Diesels

Our reporter had an interesting chat recently with busy Russell J. Miedel, president of Atlas Imperial Diesel Engine Company. A native of Wheeling, West Virginia, Miedel was associated with the Hazel-Atlas Glass Company for several years. He has been president of Atlas for three years.

Russell Miedel is active in many civic affairs and a

R. J. Miedel, president, Atlas-Imperial Diesel Engine Company.

member of a number of clubs in the Bay area. He is vice-president of the Alameda County Industries, Inc., an organization which promotes the growth of industries and looks after the manufacturers' interests in Alameda County.

A sports enthusiast, Miedel goes in for fishing, hunting and baseball in his spare time.

The London Letter

(Continued from page 77)

Shipbrokers' Protection and Indemnity Association, Limited, said that, in view of the fact that certain shipbrokers were now fixing aircraft in addition to ships, the Association had decided that the interpretation of the term "chartered shipbroker" should be held to include fixtures of aircraft as being in the normal course of a chartered shipbroker's business.

Pittsburgh Plate Glass Co., Paint Division

W. Ray Culp, Arnold J. Hanson and Harold Mesuhr (left to right, below) motivate the marine selling job in California maritime districts for Pittsburgh Plate Glass Company. Headquartered at 7412 Maie Avenue, Los Angeles, Culp is manager of Industrial Sales, Paint Division. Hanson is marine representative in the Los Angeles area and Mesuhr is Oakland marine representative.

Pittsburgh Marine Finishes are distributed by Martin & Turner, 112 North Avalon Boulevard, Wilmington, and Pedley-Knowles & Company, 134 Sacramento St., San Francisco.

Application and Performance of Bottom Paints

(Continued from page 69)

of mounting the wires which should overcome their breakage. If our tests are successful, it is believed a brush of this type will prove a pronounced improvement over all present methods of cleaning ships' bottoms, and, for that matter, aiding their preservation.

I would like now to talk about the application of paint, that is, particularly bottom paint and boottopping, which coatings are subject to water friction. I am convinced that in the aggregate better results are afforded by brush application than by spray. The action of brushing, itself, assures a better keying of one coating to the other. Further, correct and uniform film thickness being so important in the proper functioning of bottom paints, I would say that, by and large, this is better accomplished by hand-brushing methods.

Of course, brush application involves higher labor costs and is frequently difficult to obtain due to lack of skilled help. Along these lines, some years ago my company experimented with a pressure-fed brush, the flow of paint into the bristles being controlled by a trigger grip valve. Here again, my lack of engineering knowledge discouraged further experiments. I am still convinced, however, that pressure-fed brushes could be very effectively used by shipyards and painting contractors, to lower the cost of ordinary brush application. Aside from lesser paint spillage, appreciable time might be saved in that no dipping of the brush in the paint is necessary. In some drydocks, due to prevalent winds, it is necessary to confine spraying of bottoms to night-time, partly to avoid the effect of spray fog on daytime workers. When skilled shipyard labor is more available, it would seem likely that pressure-fed brushes could be used during the daytime without interference with the other drydock workers. I am convinced daytime painting, when thus made possible, will show a pronounced improvement in ships' bottom painting results.

One practice I have never quite understood is this. On a new hull or a sandblasted bottom, at least two, if not three, coats of primer are usually specified, yet on bare areas, which may appear on subsequent drydockings, only one coat of primer is frequently used. Considering the small areas to be touched up, and the nominal cost of so doing, it would seem to me to be logical to give these spots the same number of coats of primer as were required when the plating was new. This alone should pay for itself in smoother hulls and fuel saving in the years to come.

Another practice beyond my comprehension is the failure of ship owners to sandblast at least the bottom and boottop plating in the building of a new ship to assure removal of mill scale and permit better adhesion of priming coats. I have seen a number of recently built ships which have not been so treated and the detachment of paint and millscale has been most pronounced. In some cases, millscale detachment has continued for two or three or more years, and the need for repriming the bare plating has probably cost the ship owner almost as much as if the vessel had been sandblasted on the builder's ways.

Considering the cost of building a ship today and the relatively minor additional cost of sandblasting underwater plating, I am unable to fathom why this is so religiously avoided.

I would like to close my remarks by making two more suggestions. Firstly, in the face of today's painting costs,

I am convinced it would pay ship owners to assign a man to supervise each painting job. I am sure there are many marine paint manufacturers willing to train these men in proper painting procedure. As I recall the past, and even the present, I have seen some very serious and costly errors resulting from lack of knowledge of marine paints. These errors were not the fault of the shipyards, who merely did what they were told to do.

The other point I want to make is that the ship owner should seek and follow the advice of the paint manufacturer in the application of his coatings. We have known many examples where our advice was not sought or, if given, was disregarded, and with disastrous results.

New Addition to Sightseeing Fleet

To their present sightseeing fleet of four boats, the Harbor Tug & Barge Company has now added the *Harbor Tourist*, new 160-passenger glass-enclosed sightseeing boat. The company schedules one-hour sightseeing tours from Pier 41, a service which was started in March, 1947. A story on the *Harbor Sightseer* appeared in the June issue of the *Pacific Marine Review*.

The addition of the new 64 feet 4 inches long craft provides the largest boatride sightseeing service on San Francisco Bay. The fleet of five glass-enclosed boats will be equipped to carry as many as 500 passengers an hour.

Safety in Ship Repairs

(Continued from page 64)

planks to the tank top.

Refrigerator vessels present a difficult problem. As you all probably know, these ships are entirely insulated in way of decks shell and bulkheads surrounding the cargo holds. Therefore, before burning or welding it is absolutely necessary to remove the insulation in way of repairs in its entirety, as it is found that a very small spark can smoulder unnoticed and break out into a disastrous fire as much as two weeks after the work has been completed.

Summarizing, I wish to point out that safety in ship repairs is not merely the collection of high sounding phrases—it is not merely an idealistic ideology that protects men and property simply because safety signs are posted. It should be considered as seriously as the religious would consider a tenet of faith. Our belief in safety, must be practiced in a truly practical way.

We, at Bethlehem, feel that the success we have had with our safety program is due to an existing well-planned safety policy. We hold our safety conferences and make use of the precautionary measures developed at these conferences and, last but not least, all the safety measures I have mentioned are backed up with definite orders in writing from the management, comprising forty-seven articles bound in booklet form and presented to each workman at the time of his employment.

In Conclusion—May I again repeat the statement of our president of twenty years ago who said, *Accident Prevention Work Pays Three Fold Returns*.

Mobilgas Cruising Guides

Latest additions to Socony-Vacuum Oil Company's series of Cruising Guides are the guide for the Great Lakes and the Mississippi River, and guide for New York waterways and adjacent Canadian waterways.

Other available guides are: Eastport, Me. to Block Island, R. I.; Block Island, R. I. to Sandy Hook, N. J. (including L. I. Sound and New York Harbor); New York Harbor to Cape Henry, Va. (including Delaware and Chesapeake Bays); Cape Charles, Va. to Cedar Keys, Fla. (featuring the Intracoastal Waterway); Cedar Keys, F a. to the Rio Grande (featuring the Bayou Country); the Pacific Coast (featuring San Francisco and adjacent waters); the Pacific Coast (featuring Southern California); the Pacific Coast (featuring Puget Sound and Columbia River).

Guides show the location of lighthouses, lightships, and other aids to navigation, and are invaluable in planning pleasure cruises. True compass courses and distances for the more popular cruises between important harbors are indicated.

Copies may be obtained from Mobilgas marine service stations.

Texas Company Appointments

Joseph T. Froehlich

E. O. Perkins, General Superintendent of the Terminal Division of The Texas Company since 1944, has been appointed Assistant General Manager of the company's Marine Department. Joseph T. Froehlich succeeds Perkins as General Superintendent of Terminals.

Born in Emporia, Texas, Perkins started with Texaco in 1920 as a stenographer at the company's refinery in Port Arthur, Texas. He was transferred to the Terminal Division in 1931. Froehlich was born in Brooklyn and began his business career with The Texas Company in 1929 as a draftsman in the Engineering Department. He became Assistant General Superintendent of Terminals in 1944.

E. O. Perkins

Nordberg Manufacturing Co., Appoints McCamon

The appointment of W. W. McCamon as sales engineer, for both Marine and Stationary Diesel engines, is announced by R. W. Bayerlein, vice president, Heavy Machinery Division, Nordberg Mfg. Co., Milwaukee, Wisconsin.

McCamon received his introduction to the Diesel engine field with Hudson Bay Company's first trading activity in the Western Arctic 25 years ago. In 1924 he joined Atlas Imperial Diesel Engine Co. where he did testing, erecting and field service work on marine and excavating machinery engines. He left Atlas Imperial in 1931 and rejoined that company in 1943 as Central Division Manager with offices in Chicago. He was in charge of stationary, industrial, marine and manufacturing installations. Between 1931 and 1943 McCamon did sales engineering work in the food processing and refrigeration industries and taught Diesel engine courses for the U. S. Navy.

W. W. McCamon

Watson Elected a Vice President of Coast Direct Line

The Pacific Coast Direct Line, Inc., New York, have announced the election of Donald Watson as a vice president. Watson has been associated with the line since 1933, when its intercoastal service was inaugurated. He has served in both traffic and operating capacities and up until the time of this announcement was Pacific Coast manager. In his new capacity, he will remain on the Pacific Coast.

During World War II, Watson served in the Navy and at one time was naval aide to Edward R. Stettinius. He also served as northwest manager for the War Shipping Administration towards the end of the war and was recalled to special duty with Secretary of State Stettinius to head up all transportation matters pertaining to the United Nations Conference which was held in San Francisco.

De Laval Appoints Greenland

Officials of the De Laval Steam Turbine Company, have announced the appointment of J. A. Greenland as District Manager of the De Laval Seattle Office. Graduated from Rose Polytechnic Institute in 1938, Greenland joined the company in the same year, and was for some time associated with its main office in Trenton. He has been with the Seattle Office since May, 1940. Greenland is a member of ASME and the Engineers Club of Seattle, Washington.

Captain Joseph Lloyd McGuigan, USN

Capt. McGuigan Appointed by Maritime Commission

Appointment of Captain Joseph Lloyd McGuigan, USN, as acting chief of its Bureau of Engineering, has been announced by the United States Maritime Commission.

Captain McGuigan, who has been on detail to the Commission since December 1945, as chief of the Division of Small Vessel Sales, succeeds James L. Bates, whose retirement September 3 as technical head after 45 years in the government service, was announced recently.

A native of Wisconsin, Captain McGuigan was appointed to the United States Naval Academy from Oklahoma in 1910 and was graduated in 1914. After two years of duty afloat he started a course at Massachusetts Institute of Technology in 1916 which was interrupted for duty in World War I. He completed the course in 1920, receiving the degree of master of science in naval architecture.

Since then Captain McGuigan has had duty as a naval constructor in various shipyards, including Norfolk, Va.; Mare Island, Calif.; Pearl Harbor, T. H.; and Cavite, P. I. From 1931 to 1933 he also served afloat as force constructor of the Scouting Force. After a year's attendance at the Naval War College, 1933 to 1934, he was detailed to duty in the Navy Department for four years, 1934 to 1938, in maintenance, conversion and new construction work on battleships, aircraft carriers and cruisers.

Following a tour at Mare Island and until May 1941, Captain McGuigan was industrial manager of the Cavite Navy Yard and the 16th Naval District. His next assignment was as supervisor of shipbuilding during World War II for Tacoma (Wash.) and adjacent areas for the building of small tankers, C3 conversions to aircraft carriers, auxiliaries and Cimarron type hull aircraft carriers.

Propeller Club Holds Safety Conference Session

A joint luncheon of the Los Angeles-Long Beach Propeller Club and the Western Safety Conference was recently held in Los Angeles. Principal speaker at the luncheon was Frank P. Foisie, president of the Waterfront Employers' Association of the Pacific Coast, who discussed "Safety of Maritime Operations."

Panels on maritime safety were held under the chairmanship of Rear Admiral Frank Higbee, USCG (Ret.) and port warden for Los Angeles Harbor. Admiral Higbee served as vice president of the Western Safety Conference and chairman of the maritime safety program. Propeller Club members who were speakers at the sessions included William Harrington, Bethlehem Steel Corporation (Shipbuilding Division); Eloi J. Amar, general manager of Long Beach Harbor, and Alvin Allyn, certified marine chemist and accident prevention engineer.

ıtes Retires From laritime Commission

James L. Bates, naval architect ıd chief of the Bureau of Tech- .cal Affairs of the United States .aritime Commission since he ined the agency in 1939, retired ;ptember 3 after 45 years in the ›vernment service.

As a civilian employee of the 'avy Department from 1906 to)38, Bates was associated with .e design of both naval and mer- ıant vessel types, including many ı the naval vessels in our floating ıttle force in World War II, and ıs also responsible for the design ı most of the vessels built under ;e cognizance of the Maritime ›mmission since its inception in)36.

During his employment by the avy Department he was intimately volved in the design of seventeen ıfferent classes of fighting ships, cluding battleships, large cruisers, rplane carriers, submarines and de- .royers. He also had a responsible ırt in the designs of about one- ılf dozen merchant type vessels, cluding transports, supply ships, nkers, tenders and shallow draft gs.

James S. Bates

A graduate of Cornell University, ates received a degree in mechani- ıl engineering with specialization in naval architecture, in 1903. For periods in 1902 and 1903 he worked on the Great Lakes as a mold loftsman and ship fitter's helper. Upon graduation from Cornell he began his government career as an employee in the New York Navy Yard, and in 1906 became an employee of the Navy Department. He was in the Bureau of Construction and Repair and at various times was in charge of the Scientific Computing Branch and the Preliminary Design Branch.

Carl Johnson

Carl Johnson Opens Office

Now available as a consulting engineer in San Francisco is Carl Johnson who has opened an office at 298 Los Banos Avenue. Formerly employed as consulting diesel engineer for the General Engineering and Dry Dock Company, Johnson has written articles for this magazine on Diesel Engine Maintenance. He has had wide and varied experience in the diesel engineering field.

It is Johnson's contention that greater savings can be realized in the operation of marine diesel engines by the use of protective maintenance such as he has advocated in his articles.

Johnson's phone number is JUniper 4-5662.

General Steamship Corp. Takes on Delta Line

A new point of service is offered to Pacific Coast shippers by General Steamship Corporation in their capacity as Pacific Coast agents for the Mississippi Shipping Company, Inc.

Mississippi Shipping is a New Orleans corporation operating the Delta Line under the American flag with regular monthly sailings from U. S. Gulf ports to West African ports of Dakar, Marshall, Takoradi, Lagos, Apapa, Matadi, Luanda, Lobito and other ports as cargo offers.

Prior to this appointment, cargo space, sailing and rate information was available to Pacific Coast shippers only upon application to the Delta Line in New Orleans but now can be had from any one of General Steamship Corporation's Pacific Coast offices located at Los Angeles, San Francisco, Portland, Seattle and Vancouver, B. C.

Julian Arntz Acts for Harrington

Although Industrial Relations is his forte, substituting as manager of a large ship repair yard is an easy transition for Julian F. Arntz, Assistant to the Manager and in charge of Industrial Relations at the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division. Mr. Arntz has been pinch hitting for W. A. Harrington, Manager of the Company's San Pedro Yard, who is now recovering from a serious illness. This announcement was made by W. M. Laughton, District General Manager for Bethlehem's West Coast Yards.

Julian Arntz

Mr. Arntz, who is well-known in labor-management circles on the Pacific Coast, started work at the San Francisco Yard as a shipfitter apprentice in 1916. He served a four-year apprenticeship and later worked in the estimating, cost control and contracts and marine sales departments.

In 1938 he was appointed Management's Representative. Four years later he was made assistant to the General Manager, and in 1945, was appointed to his present position.

Mr. Arntz is a member of the Northern California Section of the Society of Naval Architects and Marine Engineers, Commonwealth Club, Commercial Club, The Society for Advancement of Management, Mariners Club, and Propeller Club.

He represented Bethlehem's San Francisco Bay Area Yards at the Pacific Coast Shipbuilding and Ship Repair conferences and also at the National Shipbuilding conferences in Washington, D. C., and Colorado Springs, Colorado. During the war he served as an Industry Alternate on the Shipbuilding Commission of the War Labor Board.

Mr. Harrington, who is well known in shipbuilding and ship repair circles on the West Coast, came to the San Pedro Yard in 1923 as Chief Estimator and later was General Yard Foreman and Sales Manager. He was made Assistant Manager in 1944 and Manager in December 1947.

An article by Mr. Harrington, entitled "Safety in Ship Repairs", appears on page 60 in this issue.

Transport Conversion

(Continued from page 47)

abreast of number one hatch will be stepped bulkhead. The forward part of the compartment will continue as a dry cargo space, while aft of the stepped bulkhead will be two separate areas, the port side being devoted to troop toilet facilities and shower rooms, and the center and starboard sides being converted into a troop recreation area.

Compartment number two on the second deck will not be used as a cargo carrying compartment any longer. The hatch will be cut down to twenty-four foot six by twenty feet, and will be trunked through the compartment. The port side of the compartment will provide berthing space for the troops, while passenger staterooms, transportation agents' office, library and post exchange will occupy the center section. On the starboard side will be five staterooms for four passengers each, all to have adjoining private baths.

Compartment number three, second deck, will be greatly altered as well, for on the port side a first class and officers' dining salon, which will seat twenty-two persons, a troop mess with twenty-eight seats, and a troop galley will be housed. The center part of the compartment will contain the troop scullery and the passengers' laundry, while the starboard side will afford rooms for the transportation clerks and the Transport Commander, as well as passenger staterooms. In the after end of the compartment, a small hospital, capable of providing for the needs of both crew and passengers, will be located. At the extreme forward end will be the children's play room. A watertight door will be cut between this former cargo area and the adjoining machinery space, this access providing the vessel's officers with means of entering the dining salon and the passenger area.

At the hold level, only one compartment, number three, is affected by the conversion. In this compartment, additional permanent ballast will be added to bring the elevation of the hold to a level three feet above the tank top. Forward of the hatch opening, two refrigerator boxes will be built in, each capable of handling thirty-eight hundred cubic feet of refrigerated cargo. On the port side aft will be storerooms for class "A", dry, and linen stores, while an engineer's storeroom will occupy the center after space. On the starboard side, aft, will be a new auxiliary machinery space, which will be accessible from the engine room, and which will house new equipment to care for the additional passengers and the additional refrigerated space which will be carried by the ships. Among the units this space will contain are a water purification system for chlorinating and dechlorinating the drinking water used on board, and a Heilman Packaged Boiler, carrying a working pressure of 100 psig and capable of producing 2,500 to 3,000 pounds of steam per hour. This unit will be used for heating purposes. Also to be installed is a new diesel driven three hundred kilowatt generator set, complete with switchboard, to handle the new lighting and power requirements of the vessel; a submersible bilge pump; a fire pump; and two new refrigeration compressors for the cargo refrigerator boxes.

Upon completion, each vessel will be able to carry, in addition to its assignment of passengers, approximately ninety-six thousand cubic feet of bale cargo in the 'tween decks, hatch trunks, and holds. When the refrigerator

txes which were formerly cargo boxes prior to conver-s n, and which now may be used as either refrigerated s res or cargo, are used in conjunction with the new txes for refrigerated cargo only, then each vessel is c)able of transporting twelve thousand cubic feet of fizen food. This will enable the ships to carry cargo, s)plies, freight, food, and mail to any outports which t:y might touch.

The two ships will carry a permanent civilian crew of fy-seven officers and men, and will also have on board a permanently assigned military personnel, one Trans-rt Commander and one medical sergeant. The lifeboat c)acity will be upped from eighty-six to two hundred e;hteen, with additional life floats on board to care for s ty persons.

At the present time all indications are that the new vssels will be completed by the end of the year or early i 1949. They will be operated in inter-island srvice from rijor overseas ports of embarkation to lesser installations vich may be reached only by water. It will be more e)nomical for the Army to operate these boats as feeders t the regular transport lanes than to divert the larger vssels to outpost harbors.

le Castle Line

(Continued from page 72)

f: the company in the United States for the last 43 yrs have been the Barber Steamship Company under t:ir own name, Barber Lines, Ltd. The return service vs operated under the name of Dodwell Castle Line, bt from now on the service will be operated as the Cstle Line. The Castle Line is owned by the Lanca-sire Shipping Company, whose head office is in Hong Kng. Their United States agents are the Lancashire Sipping Company, U. S. A., Inc., New York; and Pcific Coast agents, Olympic Steampship Company of Sattle. F. C. Bentzen is president; J. C. Strittmatter, ecutive vice president; David M. Gregory, traffic direc-tr. The Olympic Steamship Company was organized in 136.

Serving the Pacific route are the *Muncaster Castle, ray Stoke Castle* and *Thurland Castle.* During July the fst vessel of this service called at Pacific Coast ports ad provided an opportunity for a West Coast shipyard t perform an outstanding repair job. This vessel was te *Muncaster Castle.* She is a converted escort carrier vth new superstructure and cargo handling gear adapted t the C-3 hull. This and other vessels of the line will crry twelve passengers and eventually will have refrig-tator space for both cargo and perishables.

Quick Service by Bethlehem

In San Francisco the *Muncaster Castle* was brought ito the Bethlehem San Francisco yard for miscellaneous vyage repairs but upon opening the forward and after barings on the high and low pressure turbines, it was fund that all bearings were wiped and would have to b re-metalled. With Bethlehem's adequate force of caftsmen a rush job was started and the ship departed fr Manila only one day later than scheduled, a trial run hving been arranged between ports on the San Francisco Bay.

)wns With Odd Names

Ash, Kan.; Carpet, Tex.; Shoo, Fla.; Kay, O.; Houdy, iss.; Fiven, Tenn.; Odear, Me.; and (of special interest people from Georgia), Ogoo, Ga.

Submarine Naval Architecture

(Continued from page 55)

marine is done after submerging the ship, observing the weights on board, and preparing an equilibrium diagram from the data so obtained. From this diagram the required changes in ballast are determined.

Since the weight of a submarine must equal its total displacement when submerged and the center of gravity must be below the center of buoyancy, the weight summaries made during the design are made for the submerged condition. The surface displacement and trim are obtained by deducting the weight and moment of the water in the main ballast and fuel ballast tanks. The displacement and trim so obtained are those of her normal surface condition and can be changed only by changing the capacity or center of gravity of the main and fuel ballast tanks. Without a major operation on the ship, such changes can be made, in effect, only by partially flooding the tanks or by completely flooding some of them, since it is the unflooded part that determines the actual surface displacement and trim. The effect of carrying fuel in fuel ballast tanks is to reduce the main ballast tank capacity and cause the ship to have greater surface displacement. Deducting the capacity and moment of the unfilled ballast tanks is a convenient method of determining the surface displacement in any condition in which fuel is carried in some or all the fuel ballast tanks. It is interesting to note that it makes no difference in the surface displacement or trim whether a fuel ballast tank contains fuel or sea water, even though the two differ considerably in density. This is because water ballast must be carried in the variable ballast tanks to make up in both weight and moment for difference between the weight of the fuel and that of salt water.

At some stage during the design of a submarine, it is customary to calculate the displacement and position of the center of buoyancy of the total volume of the ship which is always buoyant. The displacement so obtained is equal to that in the normal surface condition and the longitudinal position of the center of buoyancy is the same as the longitudinal position of the center of buoyancy in the surface condition. This condition is sometimes called the "surface displacement submerged", and serves as a fairly easy check on the accuracy of the regular displacement and ballast tank calculations.

(This article will be completed in the October issue)

National Defense

(Continued from page 85)

transportation facilities receive appropriate consideration in the development of such plans. Whether ports located on the East Coast, the Gulf Coast, or on the Pacific Coast are receiving attention depends, of course, on the plan being processed. For security reasons granting permission to any one other than authorized military personnel to have access to these plans would be impracticable.

Regarding the use of less vulnerable ports, even the smaller ones may have to be utilized in any future conflict if we ever have one.

Stop Rust . . . and Save with RUST-OLEUM

Rust-Oleum slashes maintenance costs 3 ways. It's enduring protective coating seals metal against rust-forming elements. Nothing equals it as a positive, low-cost rust preventive!

1. IT CUTS PREPARATION TIME! No sandblasting or chemical cleaners are necessary. Quick wirebrushing removes paint scale, blisters, dirt, etc.

2. IT GOES ON FASTER! Rust-Oleum saves 25% of the time ordinarily required for application and covers 30% more area than ordinary materials.

3. IT PROTECTS LONGER! Rust-Oleum outlasts ordinary paint two to ten times, depending upon conditions under which it is used. This means maximum savings on every application.

FREE: New Rust-Oleum catalog showing colors and applications. Write us or your supply distributor *today*.

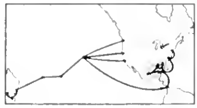
JAMES R. BOREN BOX 134 TEMPLE CITY, CAL.

---

*Matson Lines**

to HAWAII
and AUSTRALIA
via SOUTH SEAS

Now operating on express freighter fleet of 15 C-3's, 4 C-2's and 3 Liberties, providing an Express Freighter Service between ports over the following routes:



1. San Francisco and Hawaii
2. Los Angeles and Hawaii
3. Pacific Northwest and Hawaii
4. Atlantic Coast & Gulf ports and Hawaii
5. Pacific Coast and Australia via South Seas

*66 Years in the South Pacific Trade

Call any Matson Lines office for schedule of sailings or other information

MATSON NAVIGATION COMPANY
THE OCEANIC STEAMSHIP COMPANY

Offices: San Francisco • Los Angeles • New York • Chicago • Seattle

---

NIKELADIUM STANDARD A. S. A. and ACID RESISTANT FLANGED FITTINGS

CALL YOUR DEALER FOR STOCK LIST
(Fittings Sold Thru Dealers Only)

THE WARMAN PLANT OF **LOS ANGELES STEEL CASTING CO.** 6100 So. Boyle Ave. • Los Angeles, California LU-6211

MEMBER ALLOY CASTING INSTITUTE

---

4 FEDERATED *"Firsts"* give you Babbitt satisfaction

1st in Babbitt Variety . . . "XXXX Nickel" and "Thermodyne," tin-base for heavy bearing loads; "Merit" and "Record," lead-base for lighter loads; "G" and "S," lead-base for precision bearings and special properties . . . all from one source, first in the field . . . Federated.

1st in Uniformity . . . Strict lab control to meet nationally standardized specifications assures uniformity in the composition of the bearing metals you buy.

1st in Technical Service . . . 50 years of metallurgical and bearing metal experience to help you in your problems . . . experienced service engineers when you need them.

1st in Facilities . . . 11 Federated plants and 25 sales offices, 7 of them right here in the West.

For babbitt, or for help in bearing metal problems, call or write—

Federated METALS DIVISION
AMERICAN SMELTING AND REFINING COMPANY
San Francisco • Los Angeles • Portland
Seattle • Salt Lake City • Butte • El Paso

Federated First in the non ferrous field FMD

Republic Supply Appointed Goodyear Distributor

The Republic Supply Company of California has been appointed as state-wide distributors of the complete Goodyear line of mechanical rubber products.

For over eight years The Republic Supply Company of California has been a successful jobber for Goodyear in the San Francisco Bay area and it is felt that through the extension of Republic's distributorship, the combination of Goodyear's production facilities and Republic's sales and service coverage will combine to provide California consumers with the type of service they desire and require.

Due to increased sales resulting from their new relationship with The Republic Supply Company and the ever-increasing market in the west for mechanical rubber goods, Goodyear expects to expand the production of its Los Angeles plant to include several new lines. In the near future the Los Angeles Goodyear plant contemplates production on flat transmission belting and V-belts. This will be in addition to their present production of the larger sizes of hand built and mandrel built hoses, molded rubber goods, and rubber lining of tanks and piping.

Tank Tests to Predict Speeds

A series of model tests being run at the Experimental Towing Tank of Stevens Institute of Technology for the American-Hawaiian Steamship Company, will aid in settling fair compensation for ships lost during World War II. The purpose of the tests is to find the operating speed of certain full size ships.

The unique feature of these tests is that all the ships involved were sunk in action, after having been requisitioned by the Government and operated by the U. S. Maritime Commission.

The model tests will furnish vital information, as the allowance made by the U. S. Maritime Commission for the value of each ship is determined by the vessel's operating speed as well as its tonnage. The results of the Towing Tank tests will be presented to both the U. S. Maritime Commission and the operating company.

Tests are being run now on models of the 415-foot S. S. *Coloradan* and the 471-foot S. S. *Texan*.

The American-Hawaiian Steamship Company lost a total of twelve ships by enemy action during the war.

New Power Truck

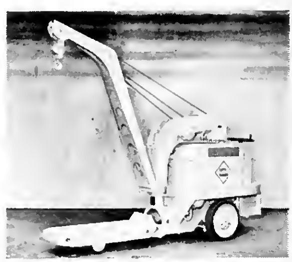
A new power industrial truck combining a low-lift platform and a crane is announced by Elwell-Parker Electric Co., Cleveland, O. The crane can pick up a load from floor level and lift it to a hook height of eight feet, within a radius of 45 degrees either left or right from base.

The truck's platform can lift and transport loads weighing up to three to five tons, depending on size and model. Loads may be piled directly on truck's platform or on skids under which the platform can maneuver after loading.

Crane and platform are operated independently of each other, so that the crane may be used by itself at any point any length of time. The boom, eight feet long, is of box girder construction, light and strong. Its foot is pivoted on a non-friction bearinged turntable base mounted on the forward end of the truck directly back of the lift platform.

Crane's load-lifting capacities range from 1,000 to 2,000 pounds, depending on model.

The Elwell-Parker crane in and out of use.



Westinghouse Appoints McDaniel Manager of Technical Press Service

Hobart C. McDaniel

Hobart C. McDaniel has been appointed Manager, Technical Press Service in the Public Relations Department of Westinghouse Electric Corporation, Pittsburgh, Pa. McDaniel will be responsible for the Company's publicity in the technical and trade magazines. He will succeed Carl E. Nagel who has resigned to Join McGraw-Hill Book Company in New York as editor of mail sales books for the engineering and industrial fields.

McDaniel was graduated in Electrical Engineering from Oregon State College, Corvallis, Oregon, in 1926. He went with the Westinghouse Lamp Division in Bloomfield, N. J., as commercial engineer in 1939 after working with Pacific Power and Light Company, Portland, Oregon and Central Illinois Public Service Company, Springfield, Illinois, as a lighting sales engineer. In 1943 he joined the Technical Press Service in the Pittsburgh office.

Standard-Vacuum Oil Appoints Assistant Manager

John M. B. Howard has been appointed assistant manager of Standard-Vacuum Oil Company's marine department.

A graduate of the United States Naval Academy, Howard had extensive experience with Jersey Standard's world-wide marine operations prior to joining Standard-Vacuum. Starting as a deck officer on tankers in 1933, he later received his master's papers and went on to occupy important shore posts at New York, Baltimore, Baton Rouge, Houston, Caripito, Aruba and other well-known oil ports.

His most recent assignment was in London, as assistant general manager of Esso Transportation Company, a Jersey Standard affiliate. In his new connection he will assist Mr. W. F. Dunning in handling the owned and chartered tankers which fly the "Stanvac" flag throughout the Far East.

Five New Diesel-Electric Harbor Tugs for Moran Towing Co.

The Moran Towing and Transportation Co., Inc. has contracted for immediate construction of five 105-foot, steel-hulled, Diesel-electric harbor tugs.

Described as embracing latest developments in shipbuilding, engineering and post-war maritime practices, the new tugs will be powered with Model 278-A, 16-cylinder General Motors engines developing 1,780 brake horsepower, with main propulsion generators supplying 1,200 kilowatts.

Tams, Inc., New York naval architects, working with Moran pilots and engineers, developed and perfected a design for the vessels, which will be constructed by the Levingston shipbuilding Co. at Orange, Texas.

"These tugs have been especially designed for docking, undocking and transporting ships in New York harbor," Rear Admiral Edmond J. Moran, president, said. "The acquisition of five such extremely high-powered units will place the company in a better position to meet the ever increasing requirements of both domestic and foreign shipping, which will be mutually beneficial. We expect deliveries to begin in December of this year."

Low Temperature Air Conditioning

(Continued from page 70)

air to hold moisture drops off as the temperature drops. Air at 70°F and 100% humidity (70°F dewpoint), for instance, contains considerably more moisture than air at 35°F and 100% humidity (35°F dewpoint). From this it may be readily seen that condensation must take place when by means of refrigeration the dewpoint of the air is lowered, or conversely when moisture is added the dewpoint rises. For any given condition of air (point "A" in Fig. No. 2) expressed in dry bulb temperature and relative humidity, the dewpoint may be established by drawing a line horizontally to the saturation or dewpoint line. (point "B").

Apparatus dewpoint.

This is the dewpoint of the air leaving a cooling apparatus and supplied to a refrigerated space to maintain the desired compartment conditions of temperature and relative humidity. Generally the apparatus dewpoint is lower than the dewpoint of the air in the compartment to compensate for moisture absorption from the product. The differential between compartment air dewpoint and apparatus air dewpoint is a function of the ratio of sensible heat and total heat of the product load. Referring back to Fig. 2 we established room conditions for citrus fruit at 32°F and 85% R.H. (air dewpoint 28½°F). If the sensible heat factor (SHF) of this product load were 1, the apparatus dewpoint would be 28½°F. Under these conditions no latent heat gain or moisture absorption would take place, and consequently the dewpoint of the air remains constant.

For a product load such as citrus fruits, the SHF, however, would be around .85 and a certain amount of moisture absorption is expected. To compensate for this the supply air must be at a dewpoint temperature lower (contain less moisture) than the compartment dewpoint. If the cooling requirement is properly calculated, the exact dewpoint differential can be established and the conditioned air will absorb just the amount of moisture given off by the product to raise the dewpoint to the compartment dewpoint.

By means of a simple chart, Fig. No. 3—
the apparatus dewpoint may be readily established for any given condition when room temperature, humidity and sensible heat factor are known.

In our example of citrus storage, room conditions were 32°F—85% R.H. (30½° W.B. and 28.4° D.P.) If the sensible heat factor is assumed to be .85, we find that the apparatus DP is 27½°F, or one degree below the room dewpoint. If the sensible heat factor happened to be .75, which means that the latent heat gain in the compartment is larger, the apparatus DP would have to be lowered to 25°F if we were trying to maintain 32° and 85% R.H. in the compartment.

(This article will be completed in the October issue)

"A battleship of the Iowa class uses 1,800,000 feet of electrical cable. As much as 400,000,000 feet of finely woven galvanized steel wire is used to protect these cables."—STEEL IN THE WAR.

KOMUL is a well-proved coating for marine service. Application to damp surfaces first recommended it for use in spaces subject condensation of moisture. Its continuous film and re-stance to chemicals recommended it for use on steel ecks under magnesite. Simplicity of application has made arine men want it for hard-to-get-at spaces.

Technically, KOMUL is an irreversible emulsion of coal-r-pitch, retaining all the protective characteristics of tch in an easily-used form.

An illustrated folder and a sample on a steel panel . . . r the asking. The panel you can twist or bend as you ill and you can dig at the coating to prove KOMUL's lhesion and toughness.

SELBY, BATTERSBY & COMPANY

5235 Whitby Avenue, PHILADELPHIA 43, PA.

J. H. CORDES
4 Davis Street, San Francisco 11, Calif.

J. M. COSTELLO SUPPLY CO.
221 N. Avalon Blvd., Wilmington, Calif.

GRACE LINE
"SANTA FLEET"

SERVES LATIN AMERICAS

S. S. SANTA ADELA
S. S. SANTA JUANA
S. S. SANTA FLAVIA
S. S. SANTA LEONOR

These C-2 fast freight vessels, equipped with refrigerator space, and limited passenger accommodations, together with modern chartered tonnage, supply frequent service between —

BRITISH COLUMBIA · WASHINGTON · OREGON · CALIFORNIA

and

Mexico · Central America · Panama · Colombia · Ecuador · Peru · Bolivia · Chile

SEATTLE
White Building
SEneca 4300

SAN FRANCISCO
2 Pine Street
SUtter 1-3800

LOS ANGELES
523 W. Sixth
MIchigan 7811

VANCOUVER
991 Hastings St., W.
PAcific 7271

PORTLAND
738 Mead Bldg.
CApitol 1013

Southern CALIFORNIA'S Largest

SHIP DISMANTLERS

LIBERTY SHIP EQUIPMENT

- MAIN ENGINE PARTS
- CONDENSERS
- REFRIGERATION

DIESEL GENERATORS
20, 30, 60, 75KW DC. 100, 1000KW AC.

TURBO-GENERATORS
60, 75KW DC. 150, 200KW AC.

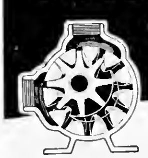
DIESEL ENGINES
225, 900, 1700, 1800HP—GM & FM.
450HP twin, 900HP quad.

LST & LSM TYPE VESSELS
Suitable for cargo
Attractively Priced — Immediate Delivery

NATIONAL METAL & STEEL CORP.

DEPT. F, TERMINAL ISLAND, CALIF.
LOS ANGELES: NEvada 6-2571
Cable: NACOR

VIKING ...originators
of the DESIGN THAT MADE ROTARY PUMPS FAMOUS



Sept. 1948

All Rotary Pump Users,
Everywhere.

Gentlemen:
You're right! Today's market is cluttered with rotary pump manufacturers. For many it is just a sideline.
But with well over a million Viking Rotary Pumps in service today throughout the world, shrewd pump buyers in every field of industry and commerce prove they prefer the pump that is different! Get the facts! ... Write today for complete bulletin

Yours Very Truly
Viking Pump Company
Cedar Falls, Iowa.

PACIFIC COAST DISTRIBUTORS

E. E. BURTON
4432 Long Beach Ave., L.A. 11

DE LAVAL PACIFIC COMPANY
61 Beale Street, San Francisco

KEEP POSTED

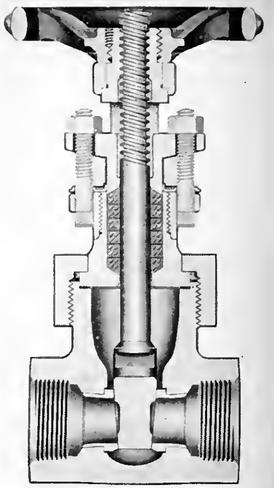
New Equipment and Literature for Yard, Ship and Dock

Crane Co. Announces New Line of 600-Pound Steel Gate Valves

To meet a demand for small, compact valves in the 600-pound class, Crane Co., Chicago, has announced a new line of union bonnet 600-pound cast-steel gate valves.

The new XW valves are recommended for superheated or saturated steam, hot or cold water, ordinary air, natural gas, fuel oil, gasoline, low-viscosity oil such as is used in hydraulic systems, butane, propane, and for fluids that are non-lubricating and relatively non-corrosive; top temperature recommendations are 850 F. The X valves are recommended for oil and oil vapor at temperatures up to 1000 F.; these valves are not recommended for steam of other non-lubricating fluids, because the Exelloy-to-Exelloy seating faces have a tendency to gall in such service, particularly if the seating loads are unusually high.

The new line of union bonnet valves does not replace Crane 600-pound small steel bolted-bonnet valves, which Crane will continue to manufacture.



New Crane Valve

C-O-Two Motion Picture Film Available

An interesting industrial film has recently been released by the C-O-Two Company. It explains the manufacture and demonstrates the use of C-O-Two fire-fighting equipment.

This film will be shown before interested groups, without charge, by Ets-Hokin & Galvan, California C-O-Two distributors. Reservations may be made by calling any of the seven Ets-Hokin & Galvan branches in California cities. The film is entertaining as well as instructive, and has already been shown before Coast Guard Auxiliary groups, the Port Engineers Society, and other marine groups interested in safety at sea.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

.... issue. Page No. ....

....

....

....

(Identify by name of manufacturer and catalog)

NAME ....

BUSINESS ....

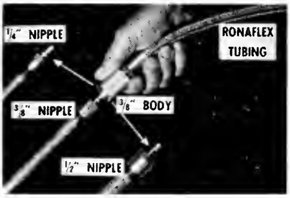
ADDRESS ....

....

Ronaflex Design Improvement

Increased convenience for the user and substantial reduction in flexible tubing parts inventory are now possible through a design development announced by Ronaflex Tubing Co., Inc., of Philadelphia.

Ronaflex Assemblies, the flexible-



as-rubber, tough-as-steel tubing with snap-on couplings, are interchangeable on various nipples. As illustrated, the 3/8" Ronaflex coupling body fits 1/4", 3/8", and 1/2" nipples. The 1/4" and 1/2" bodies also fit all three nipples.

The degree of interchangeability varies with the type of coupling and with the size. The 1½" and 2" regular coupling bodies, for example, are interchangeable with 1½" and 2" nipples. Thus, a limited number of sizes of Ronaflex Assembles will fit a wide variety of nipple sizes. Only a relatively few sizes of Ronaflex Assembles need be stocked to fit all sizes of nipples from 1/4" to 2".

Devoe and Raynolds Acquires Bishop-Conklin Company

Elliot S. Phillips, President of Devoe & Raynolds Company, Inc., announces the acquisition of the Bishop-Conklin paint company of Los Angeles, California. In addition to enlarging the present production facilities of the Bishop-Conklin Company, a new synthetic resin plant will be constructed and should be in operation in late October.

The Bishop-Conklin Company will preserve its identity and operating policies as a separate division of Devoe & Raynolds Company, with its entire personnel continuing under the guidance of Emerson C. Bishop and William H. Conklin.

Quaker Qua-Flex Fire Hose Tested

Operating tests of their new Qua-Flex Fire Hose were recently conducted by the Quaker Pacific Rubber Company of San Francisco. One 75-foot length of Qua-Flex Fire Hose was brought from 0 pressure to 300 pounds pressure. One 50-foot length of Qua-Flex was burst at 385 pounds pressure. The couplings did not slip or shift in any manner and there was no evidence of any leakage.

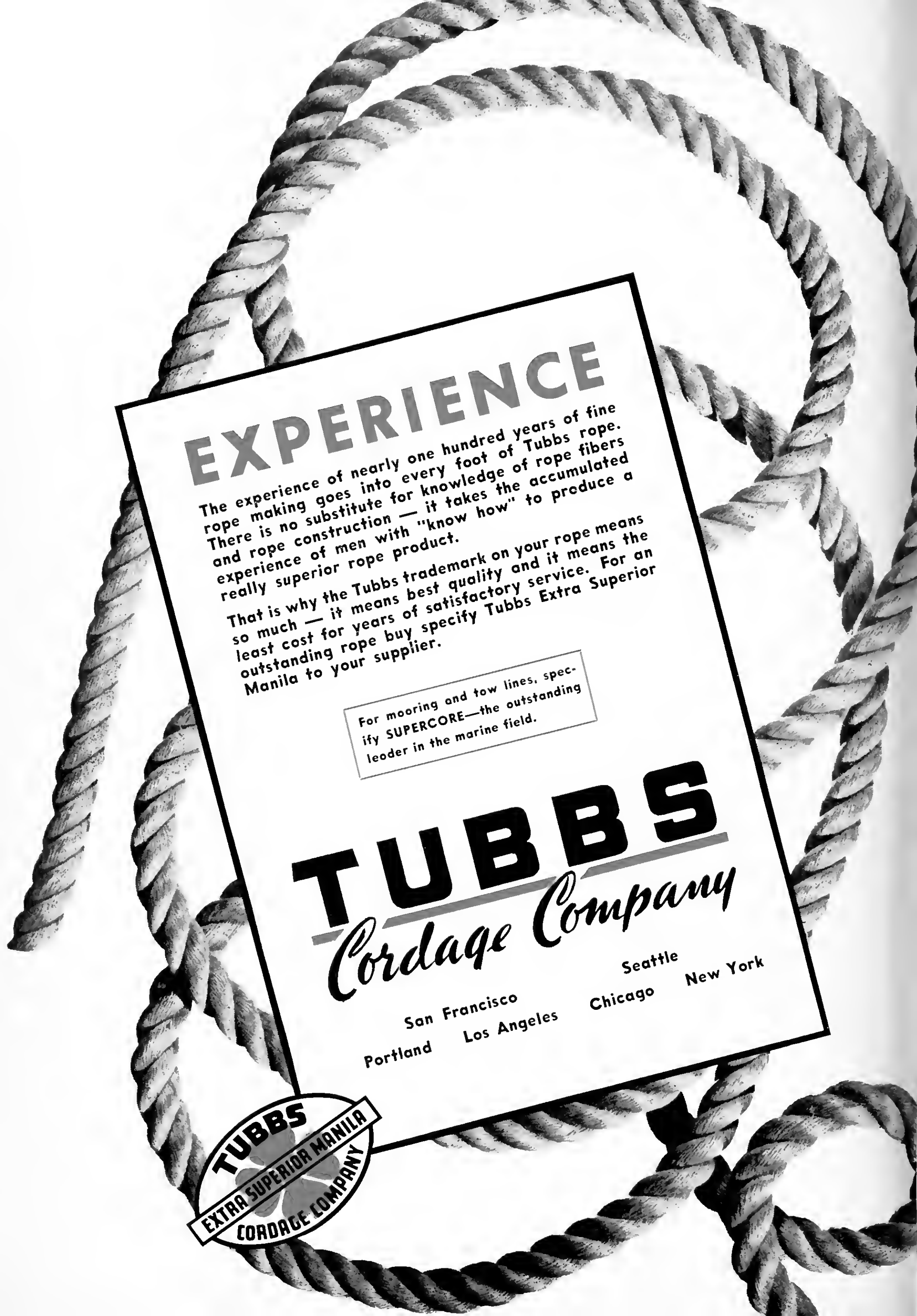
Cotton rubber lined Qua-Flex Fire Hose is a great development in fire protection hose. It is said to be the only cotton rubber lined hose manufactured in 75-foot lengths which will fold and fit in conventional linen hose racks. It is a 300-pound test pressure fire hose and eliminates water damages normally incurred in using unlined fire hose. Lightweight—a 75-foot length only weighs 19½ pounds—it has been approved by Factory Mutual Laboratories and leading national, marine and industrial firms. It is manufactured in 1½", 2" and 2½" sizes and in 75, 50 and 25-foot lengths, and is availabl< for immediate delivery from any Quaker branch or Quaker distributor. A descriptive folder may be had on request.

Present at the operating tests of the new fire hose were Lieutenant Commander de Soball, United States Coast Guard; C. MacCarthy, President, American Elkhart Company; H. Albro, Vice President and General Manager, American Elkhart Company; Messrs. James T. Moore, Max Moore, James T. Moore, Jr., H. P. Anderson, George Kerska, E. L. Valente, Bill Squires, Mike Coonan and Jim Flaherty, all of the Quaker Pacific Rubber Company.

At the operating tests of Qua-Flex Fire Hose. Left to right: E. A. Raines, Hose Tester, San Francisco Corporation Yards; J. T. Moore, Jr., Vice President, Quaker Pacific Rubber Company; George T. Kerska, Manager, Engineering Division, Quaker Pacific; Max Moo e, Executive Vice President, Quaker Pacific; Hal Hoskier, Manager, Marine & Export Division, Quaker Pacific; James T. Moore, President, Quaker Pacific; James G. Flaherty, Sales Representative, Quaker Pacific.

OCTOBER, 1948

Pacific MARINE REVIEW


EXPERIENCE
The experience of nearly one hundred years of fine rope making goes into every foot of Tubbs rope. There is no substitute for knowledge of rope fibers and rope construction — it takes the accumulated experience of men with "know how" to produce a really superior rope product.
That is why the Tubbs trademark on your rope means so much — it means best quality and it means the least cost for years of satisfactory service. For an outstanding rope buy specify Tubbs Extra Superior Manila to your supplier.
For mooring and tow lines, specify SUPERCORE—the outstanding leader in the marine field.
TUBBS
Cordage Company
San Francisco
Seattle
New York
Portland
Los Angeles
Chicago
TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY

Pacific MARINE REVIEW

. HINES
Publisher

. I. DeROCHIE
Assistant Publisher

. OUGLAS MacMULLEN
Editor

IL FAULKNER
Advertising Manager

. I. DeROCHIE, Jr.
Assistant Advertising Manager

DROTHY GRAVES
Assistant to Editor

D.VID J. DeROCHIE
Los Angeles Advertising-Publicity

DS ANGELES OFFICE
4 Wilshire Blvd., Beverly Hills
elphone—BRadshaw 2-6205

SAN FRANCISCO
lephone—GArfield 1-4760

ci Marine Review is indexed
urly by Engineering Index.

Member Audit Bureau of Circulations

scription rates:

On year, $2.00; two years, 3. ; three years, $5.00; for- ig $1.00 additional per year; in e copies, 25c.

TABLE OF CONTENTS - - - - - - OCTOBER, 1948

PUBLISHED AT 500 SANSOME STREET • SAN FRANCISCO 11, CALIFORNIA

Columbian experts examining and grading newly arrived manila fibre before shipment to the States.

And like gold, the pure manila fibre you get in famous Columbian Tape-Marked Rope is the *standard of matchless quality.*

From the leading fibre-producing plantations of the Philippines, Columbian buys only the choicest fibre.

It's thoroughly cleaned. It's graded and classified by Columbian's own inspectors. It's rigidly inspected by government officials. Then — and only then — is the fibre sent to the Columbian Mills at Auburn, N. Y.

From fibre to Tape-Marked Columbian Rope . . . every step is quality-controlled for your satisfaction.

COLUMBIAN ROPE COMPANY
400-90 Genesee St., Auburn, "The Cordage City," N. Y.

There is no finer rope!

Pacific MARINE REVIEW

Japanese Shipping

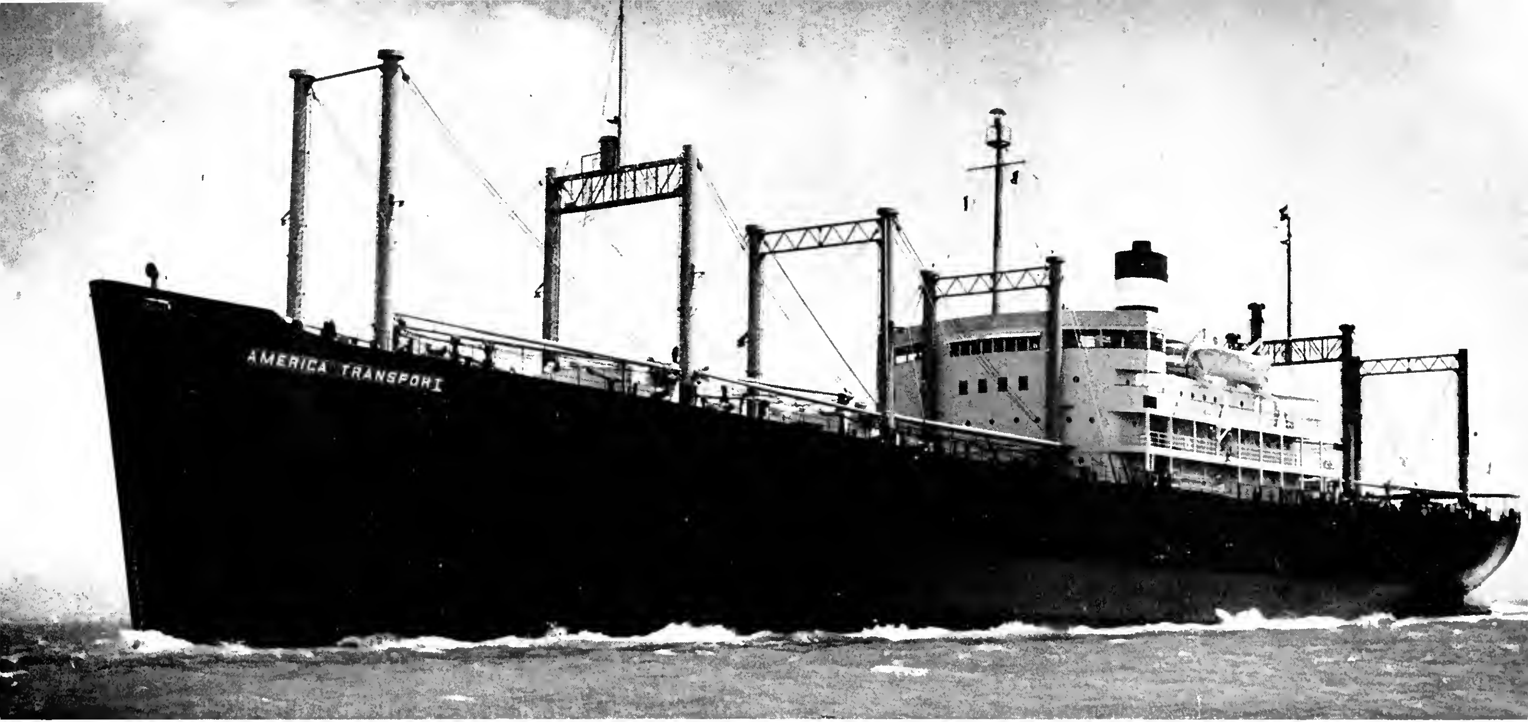
IT WILL COME as a terrific shock to most of the maritime industry that now under consideration in Washington is a plan that would permit Japan to restore its merchant fleet to its complete prewar tonnage of four million gross. American shipping is indebted to the National Federation of American Shipping for publicizing this fact, and will want to support it to the limit in its opposition to the plan.

Among all American industries the shipping industry fought the longest, suffered the most, and gained the least from the domination of Japan on the seas, and now an apathetic country is not only lagging in rebuilding its own merchant marine but is actually considering letting the enemy (for a peace treaty is a long way off) return to compete with its low cost fleet. The wartime and postwar expectation that Japan would never again be able to swarm over the oceans of the world with ships that were far cheaper than ours to build, and far cheaper than ours to operate, and in addition were subsidized in the building and operation by the government, seems in danger of proving as ephemeral as were the assurances of peace.

The 4,000,000-ton figure represents a fleet that carried 65% of Japanese overseas exports and imports, 92% of nearby foreign trade and 100% of domestic commerce, at a time when American ships were carrying less than 30% of American total exports and imports. And there is no justification,—practical, theoretical or altruistic,—for any such tonnage, even if American sentiment were not completely opposed to any restoration whatsoever.

In the first place, Japan's shipping never did account for more than 7/10 of 1% of her national income and even against this figure there were offsets. For instance, fuel oil had to be purchased abroad. In the second place, Japan is not likely to reach her prewar export position for a long while, for all possible industrial production will be needed in restoring home economy. She no longer has access to Manchurian iron and coal. Why then such a fleet? It can only be used in destructive competition on the Pacific. Surely those who are aiding in the establishment of a stable nation over there could concentrate on channels of production that are more essential to the well-being of the Japanese people. The building of ships for domestic service or Asiatic mainland service is within reason. Those listed by the American Bureau on another page of this issue could come within that classification.

It is to be hoped that the opiate of victory will not dull our senses to the need for a lively interest in what is going on in other parts of the world. We have an interest in Japanese shipping that is just as vital as it was in 1945.



The America Transport

Formerly the "Hawaiian Shipper," this C-3 vessel, built for Matson in 1941, was lend-leased to Britain and renamed "Empire Fulmar." Returned to the U. S., she was reconverted to a troopship and made twenty wartime voyages across the North Atlantic, and after Germany's surrender participated in the Guam, Saipan and other invasions and later repatriated troops from throughout the world.

The America Transport

RECENT PURCHASE and placing in operation of the *America Transport* focuses attention once more on the successful progressive development of Pacific Transport Lines into a major U. S. steamship company since its organization slightly more than two years ago.

The *America Transport*, modification of the standard C-3 type vessel, represents the best in heavy freighter design of the American Merchant Marine from the point of view of speed, cargo capacity, cargo-handling equipment and stowage. The work was carried out at the yard of the Moore Dry Dock Company, whose noteworthy conversion jobs have been the subject of many recent feature articles in the Pacific Marine Review. The ship has unusually fine modern accommodations for twelve passengers, pursuant to the company's interest in this development in freighter operation.

The ship was built in 1941 under contract for Matson Navigation Company by the Federal Shipbuilding & Drydock Company. Her specifications are: length overall, 490′ $8\frac{5}{8}$″; length between perpendiculars, 465′ 3″; beam moulded, 69′ 6″; depth to shelter deck 42′ 6 ″; load draft, 28′ $7\frac{3}{8}$″; displacement to load draft, 17,615 tons; gross tonnage, 7,771; net tonnage, 4,562; deadweight, 12,328; bale capacity, 709,245 cubic ft..

The most apparent departure from the standard C-3 vessels is the flush forecastle deck, instead of the customary raised forecastle. This gives an exceptionally clear main deck for stowage of deck cargo.

The vessel has five hatches, double-ganged at each hatch, providing twenty sets of gear, booms and winches.

She is equipped with four deep cargo tanks in No. 2 hold with a total capacity of 1733 tons. Cargo is conditioned with forced ventilation, and of especial interest are six special cargo lockers of 23,482 cubic feet located between decks in No. 2 upper hold. These lockers are built of heavy expanded metal fastened to channel iron frames and are used for carrying bonded and similarly valuable shipments.

Propulsion equipment includes DeLaval turbine with double-reduction gear drive, normal shaft horsepower of 8500, with propeller diameter 21′ 8″; 80 revolutions per minute. There are two Foster-Wheeler D-type watertube boilers (H. S. 16494) with 465 pounds working pressure. Two new Coffin feed pumps were installed, in line with the latest developments in boiler water control. Her speed is 18 knots.

Richard A. McLaren, president, Pacific Transport Lines.

Safety at sea, as well as future maintenance, were factors guiding the architects.

Her navigation equipment includes Sperry Gyro-pilot, Sperry Gyro Compass, and associated equipment, including conventional tele-motor steering gear. She has two new Welin lifeboats, 70-man capacity, complete with the Welin gravity type davits.

The smokestack has a special nozzle fitted to the inner casing and extending two feet beyond the outer casing to eliminate soot from the midship section of the ship.

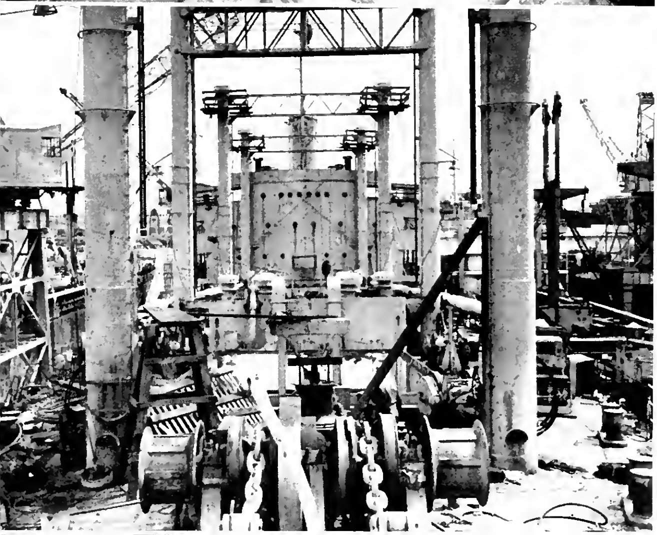
Crew quarters are unusually large and well-appointed.

But as in all the conversion jobs carried out by Moore Dry Dock Company, the woodwork and joiner work was outstanding. Moore officials expressed the belief that this complete job was one of the finest of their achievements, and Port Engineer A. J. Ederer and Operating Manager

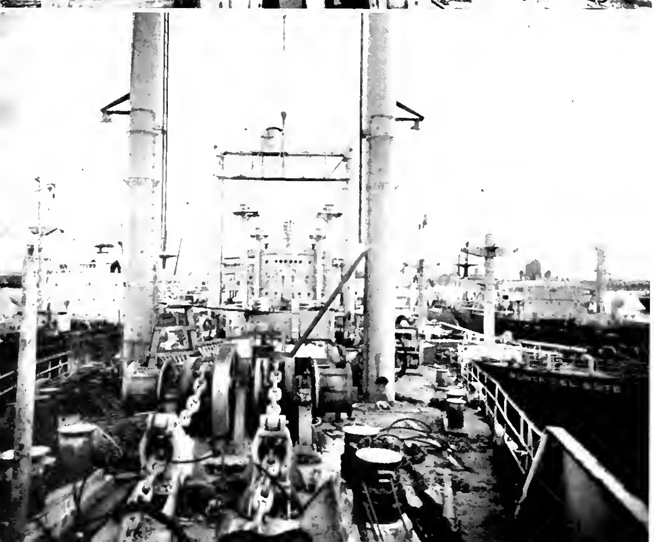
"America

Pictures of vessel being converted
ger cargo vesel by Moore Dry Do
Lines.

Part of lounge and stairway during conversion.



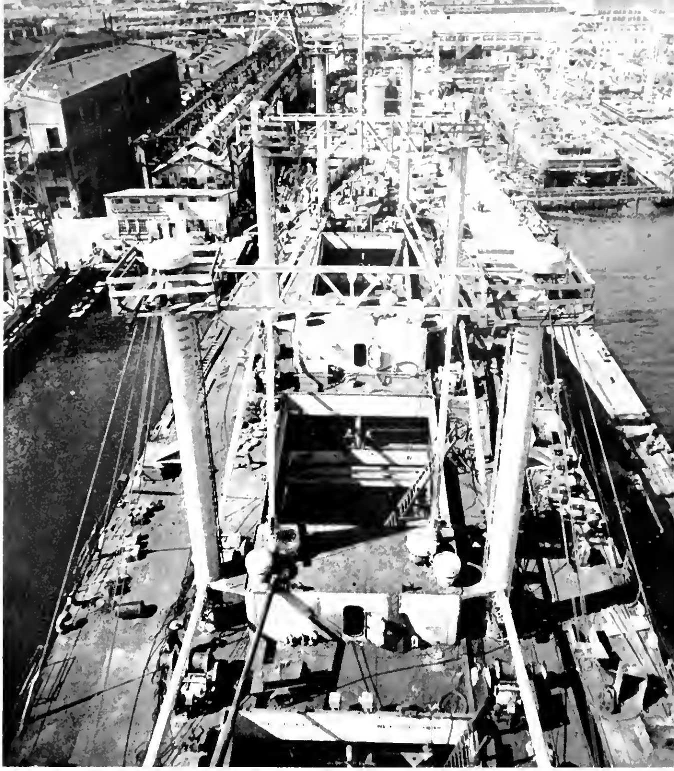
Left and below: Main deck forward, looking aft from bow.



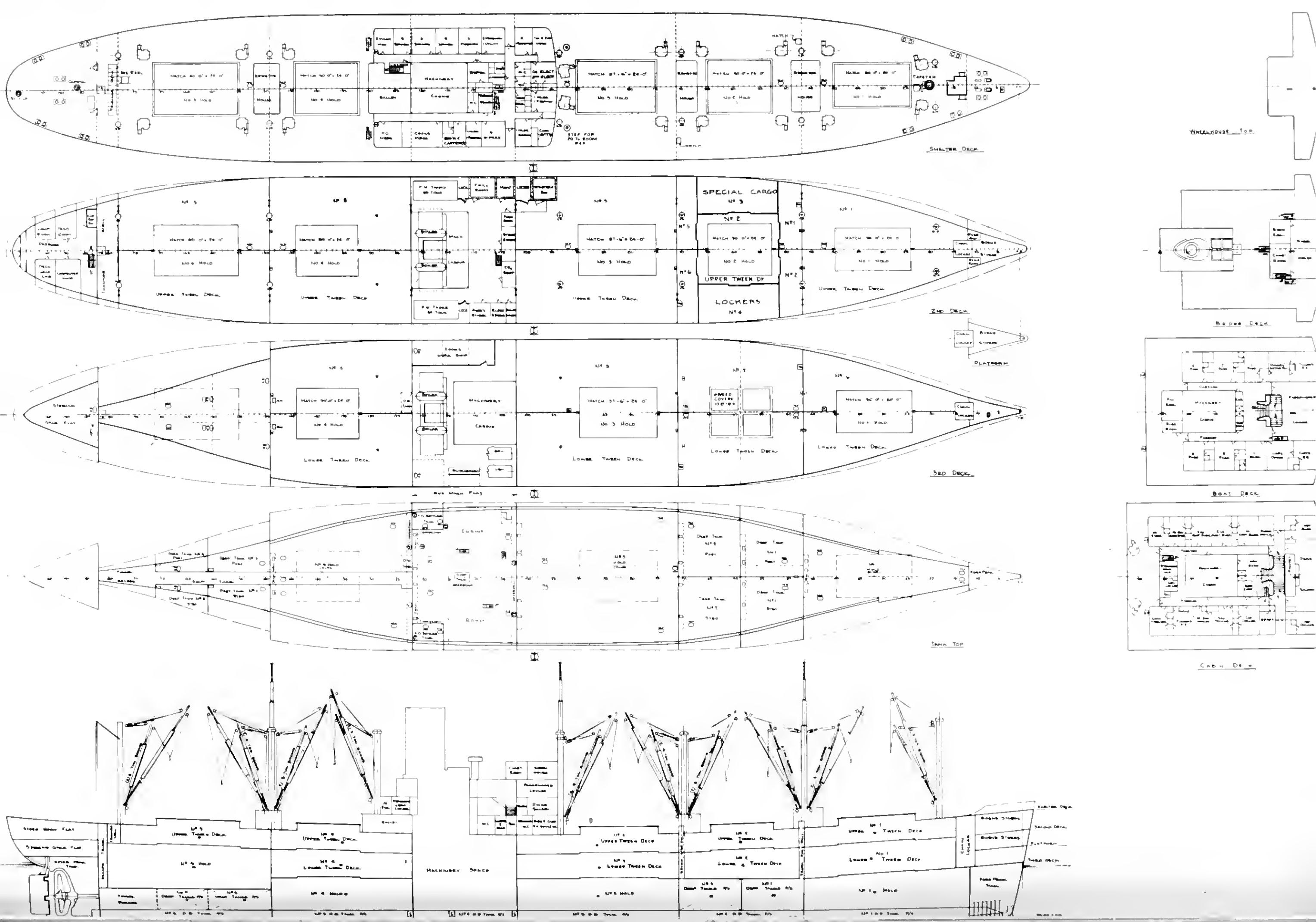
Transport"

from troop transport to C-3 passen-
ck Company for Pacific Transport

Main deck looking forward from radar mast.



New Passengers' lounge during conversion.


SHELTER DECK
WHEELHOUSE TOP
SPECIAL CARGO
Nº 3
Nº 2
UPPER TWEEN DK
LOCKERS
Nº 4
2ND DECK
BRIDGE DECK
PLATFORM
3RD DECK
BOAT DECK
TANK TOP
CABIN DECK
MACHINERY SPACE




Maitland S. Pennington
Vice President

James O. McManus
Operating Manager

Hiram V. Walker
General Traffic Manager

Stanley G. Coppel
Asst. Operating Manager

same time, Pacific Transport will maintain its own office in Chicago and will continue current agency arrangements with Williams, Dimond & Company at Los Angeles, Portland and Seattle, as well as with the J. H. Schaefer Company of Detroit, Michigan.

Headquarters of the Line are at 244 California Street, San Francisco. Other company offices are located in Los Angeles, Washington, New York, Chicago, Detroit.

Foreign agents include Jardine, Matheson & Company, Ltd., in China and Hong Kong, and Everett Steamship Corporation in the Philippines and Japan. A. H. Laidlaw, who has been active in Far East shipping circles for more than fourteen years, is owner's representative in the Orient for the line.

◀ On facing page.

Deck plans and inboard profile of the America Transport. Top to bottom: Shelter deck, second deck, third deck, tank top, profile.

Down the side of the page: Wheelhouse top, bridge deck, boat deck, cabin deck.

Joseph A. Moore, Jr., president, Moore Dry Dock Company, and Joseph A. Moore, chairman of the Board.

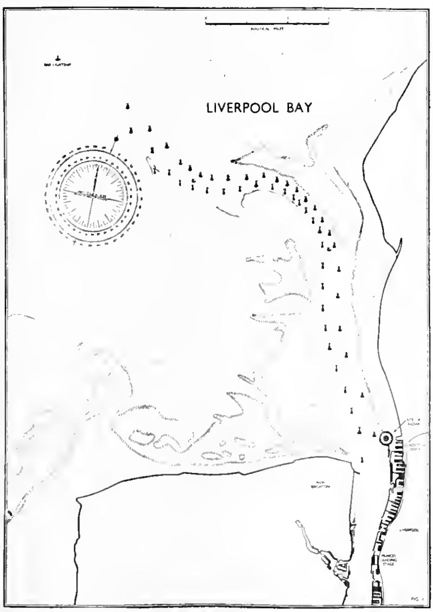
Harbor Radar—

Liverpool Gets First Installation

THE WORLD'S FIRST specially-designed port radar system for harbor supervision was officially put into commission on July 30 at England's great port of Liverpool.

Although another British port, that of Douglas, Isle of Man, was actually the first port to use radar for the supervision of ships entering and leaving harbor, the radar set employed is an ordinary ship's set. This installation is adequate for ports such as Douglas, where the approaches offer few pilotage problems and the docks are adjacent to the sea, but is totally inadequate for a major port such as Liverpool, with its great traffic density. The Liverpool radar equipment is in fact a complex machinery that gives a complete picture of the twelve miles of narrow tortuous fairway between Bar Lighthouse and dock. Costing between £30,000-£40,000 ($120,000-$160,000) it was designed, tested and built in only 18 months—a very notable achievement in the opinion of harbor authorities. The manufacturers were the Sperry Gyroscope Company, of Great West Road, Brentford, Middlesex, England.

The new radar installation has uses beyond the ability to direct ships safely into dock in foggy or bad weather. In the first place, it ensures that more vessels can use a



Left: Daytime sketch of Liverpool Bay showing markers in the channel.

Below: The same area as it appears in the radar scope. Heavy white markings indicate high structures and hills along the channel.

channel at one time, thus providing quicker turnaround. Second, it will reduce delay costs—the delay of one hour may easily extend to the loss of tide, which would cost an average vessel some £400 ($1,600). Installation will furthermore afford Port authorities exact continuous observation of all shipping within the Port area and approaches up to twenty miles range. It will also enable them to check the positions of all floating navigational marks—in place of the previous method of a physical check every few days—and it will give instantaneous information of any shipping casualty or any dangerous obstruction in the Channel approaches.

The complete radar installation—which is based at the northwest corner of Gladstone Dock—consists of a 15-foot wide rotating scanner mounted on top of an 80-foot ferro concrete tower, similar in appearance to a lighthouse.

The building adjacent to the base of the tower contains radar transmitter and receiver equipment and all other services necessary to operate the system. As the tower is built on the shore 20 feet above sea level, the height of the scanner is 100 feet above sea level. From this position the scanner has an unrestricted view covering the whole of Liverpool Bay and about three miles up river (as far as the Prince's Landing Stage). The scanner has special heaters built in to prevent icing and has been stressed to resist wind velocities up to 100 m.p.h. It is driven by a 6 h.p motor at 10 r.p.m. During six seconds rotation, it obtains an echo of every object within 20 miles and these echoes are reproduced on six screens in the Radar Display room. The drive mechanism of the scanner is housed in a weatherproof room at the top of the tower, which will enable personnel to carry out maintenance work under shelter.

Two main units in the Radar Control room are the display console and the cupboard containing transmitter-receiver equipment. Intricate, complicated radar devices are all housed in a gleaming white cabinet. Each of the six display units is constructed separately in order to simplify repairs and maintenance. If one set should go out of action, the unit is merely removed and replaced with a spare.

One of the six display screens shows a small-scale true plan view of the whole of Liverpool Bay, giving the normal maximum range of 13 miles. If desired, the operator can switch the display up to the maximum range of 20 miles out to sea. The next four displays each show a view of a sector of the channel on a scale four times greater than that of the general display. These enlarged scale displays are of a new type which shows a precision picture of a selected part of the channel, and give a true plan presentation without distortion. The areas covered by these displays slightly overlap each other, so that a continuous large-scale picture of the whole approach channel and estuary is given. The sixth, known as the "wandering display", gives a large-scale plan picture of a sector which can be moved to cover any part of Liverpool Bay. This is particularly valuable, as it can be switched to 22 different positions and can be used to provide additional cover of any area where congestion is severe.

A number of countries are showing considerable interest in this new Safety Harbor radar supervisor. The Ports of Basra and Antwerp, for example, are already studying specifications with a view to installing similar equipment. Installation of this equipment would be simple in any part of the world, as the set now based in Liverpool has been designed for universal application. It is expected that many other major ports in the United Kingdom, including the Port of London, will be similarly equipped in the near future.

Radar Guides Through Dust Storms

HILLCONE STEAMSHIP COMPANY
311 California Street
San Francisco 4
U.S.A.

S.S. CORNELL
Suez, Egypt
July 23, 1948

Sperry Gyroscope Company, Inc.
81 Willoughby Street
Brooklyn, New York, U.S.A.

Gentlemen:

Knowing that you are interested in the performance and capabilities of Sperry radar, I am submitting the following for your information. If you wish to use any—or all—of this data you are welcome to.

This vessel for the past three voyages has been operating in the Red Sea, Arabian Sea, Gulf of Oman and Persian Gulf making such ports as Ras Tanura in Saudi Arabia and Abadan in Iran. Shore lights and other aids to navigation are few and far between along these routes, sand and dust storms frequent and visibility often cut to one mile, or less, for prolonged periods. Numerous islands lay along the route, as well as capes and shoals to be cleared. Dust and haze make celestial navigation impossible for days at a time and when positions are obtained they are subject to large errors.

With our Sperry radar we have been able to take all this in our stride, no time has been lost by the vessel arriving at, or sailing from, dust shrouded ports, collisions have been averted during very poor visibility by wide margins, islands safely passed and shoals avoided. On two occasions we have made Ras Tanura in one mile visibility due to sand and dust, picking up the route beacons which are but three pile beacons, at a distance of 15 miles with our Sperry radar. Last voyage we sailed from Ras Tanura in a dust storm and had it not been for our radar we could not have done so—at least 12 to 18 hours was saved for the vessel. This is but one instance where Sperry radar has saved the vessel valuable time

We have had our radar about a year and during that time it has helped us to navigate the Straits of Magellan, Mozambique Channel, Gulf of Suez, Straits of Gibraltar plus areas previously mentioned. Our Sperry Loran brings us in from the wide open spaces and our Sperry radar takes over from there. I cannot speak too highly of both installations.

Very truly yours,
S.S. CORNELL
/s/ V. P. Marshall, Master

The George Washington

The George Washington

NOW IN PASSENGER SERVICE in a big way is the Alaska Transportation Company of Seattle, with ten-day sailings of the 5,134-ton *George Washington* along the "Totem Route" to Ketchikan, Juneau, Haines, Sitka and Skagway. Reconditioned from war use by the Puget Sound Bridge and Dredge Company, the 375-foot vessel is now the pride flagship of the AT fleet, and if operations this season are successful, the company has a companion vessel, the *Empire Consequence* standing by in Lake Union for conversion to similar service.

Machinery

Not to be confused with the 23,000-ton *George* of the same name nor with the United States Lines' *Washington*, the *George Washington* was originally built at Newport News Shipbuilding in 1924 for Eastern Steamship's New York to Bermuda run; she later ran from Norfolk to New York and Boston. Her Curtis turbines, built by Newport News, have been brought out and overhauled "to the last valve," as was most of the engine equipment. Her Babcock & Wilcox boilers were given refinement in the form of Diamond Soot Blowers, installed by Consolidated Services, Seattle. There was rebricking and some retubing and casing repairs. Probably the biggest engine room job was installation of a 150 kw Worthington steam turbine driving a Westinghouse generator, more than doubling the vessel's generating capacity. A Wallace-Tiernan chlorinating system has been installed, and Walter Kidde's Zonite system was extended to completely cover the ship.

Todd's Hoboken yard prepared the ship for her journey from the East Coast and Puget Sound Bridge and Dredge won the bid over Eastern yards despite her lying on that coast at the time.

Passenger Accommodations

Passenger quarters were refurbished on the *George Washington*, and all public rooms were redecorated in modern tones. All furniture is new, with new draperies, rugs and built-in settees. There is a large lounge (music room) forward and a maple-floored pavilion aft, adjoining the smoking room and bar. There was no hot water in passenger quarters previously so this was a substantial (and not easy) part of the reconditioning job. New rubber tiling was installed and some bunking space was adjusted. The passengers' pantry and galley were changed considerably and a new oil stove was custom-built into the existing structure by Lang Manufacturing of Seattle, who also fitted in an electric bakeoven. New paneling,

(Please turn to page 83)

Owner's stateroom

Pavilion

Operation, Control and Maintenance of Marine Turbines

EDITOR'S NOTE

At the October 1 meeting of the Society of Port Engineers, San Francisco, Goerge Barr and Hughes Ogilvie of General Electric Company addressed the members on the highly technical subject of operation, control and maintenance of marine turbines. These talks have been approved by the General Electric Company for publication in the *Pacific Marine Review*.

Speed Control and Efficient Operation of Turbines

By GEORGE BARR

THE 6000 and 10,000 HP Electric Drive turbines are similar in general construction to ordinary land generating sets with the exception that speed control is variable whereas on land units speed as a rule is constant and other special features are incorporated for marine use.

The governor on Marine types has been designed to operate effectively through a broad range. Actually from 15 per cent of normal speed to 110 per cent normal speed. And when a desired speed has been established by the watch engineer, the governor will automatically control the speed of the prime mover whether the propeller is submerged or breaking surface in a sea way. When hand valves are provided they are adjusted to normal speed and the governor set as a pre-emergency governor.

The governor may be described as a fly-ball type, at least the principle is the same. The sketch shows the governor, in section, stripped to its bare essentials. The weights are spring opposed and both weights and springs are designed to give narrow regulation through a broad range of speeds. The governor is driven by the turbine shaft through a worm and gear. Its only effort is to move a balanced pilot valve for admission or drainage of oil pressure to or from an hydraulic cylinder.

The pilot valve bushing is movable and is connected mechanically to the speed lever on the control panel; therefore, moving this bushing to open or close oil ports is all that is done manually to increase or decrease speed of the prime mover.

The control valve is opened by hydraulic pressure and closed by an opposing spring. This valve moves in response to the governor during automatic operation

(Please turn to next page)

Operating Procedures On Electric-Drive Vessels

By H. W. OGILVIE

Introduction

THE FIRST important application of turbine electric drive was on the Collier U. S. S. *Jupiter*, commissioned in 1913. This ship, reconverted as an aircraft carrier and renamed the U. S. S. *Langley*, was the first aircraft carrier to be put into the service of the U. S. Navy. Up until the time she was lost, the *Langley* held the record for low maintenance costs on propulsion machinery. It was the highly successful operation of this installation on the old *Jupiter* that paved the way for the adoption of turbine electric drive by the Navy for its battleships.

The U. S. S. *New Mexico*, a quadruple screw ship of 28,000 shaft horse-power, the first of the electric drive battleships, was commissioned in 1918 and was closely followed by the well-known battleships, *California*, *Maryland*, *Tennessee*, *Colorado* and *West Virginia*. The airplane carriers *Saratoga* and *Lexington*, completed in 1927, were each equipped with a turbine electric propulsion system normally rated 180,000 shaft horsepower. These two ships held the distinction of being the highest powered ships ever to be built in the United States until the construction of the U. S. S. *Iowa* in World War II. The *Saratoga* was one of the fastest and most reliable capital ships of the U. S. Navy until the day of finish at Bikini.

The U. S. Coast Guard adopted turbine-electric drive for its cutters *Tampa*, *Haida*, *Mojave* and *Modoc* in 1921 and was the first to use synchronous propelling motors. Although several freighters constructed as part of the World War I building program were equipped with electric drive and a few installations were made on privately owned ships during the period from 1920 to 1927,

(Please turn to page 49)

Speed Control and Efficient Operation of Turbines

(Continued from preceding page)

and in response to the speed lever while maneuvering or changing from one speed to another. The action is simple. Oil pressure of 50 lbs. is admitted to the hydraulic cylinder by the pilot valve if additional steam flow is to be admitted to the turbine; on the other hand, the same oil pressure is drained from the hydraulic cylinder if steam flow and speed has to be reduced.

Emergency Governor and Tripping Device

Limiting speed of the turbine generator is done by a very simple device. On the 6000 HP sets, a spring opposed plunger which is carried in a hub on the turbine shaft remains inoperative at all speeds below 20% overspeed. In case the turbine should overspeed, the spring force is overcome by centrifugal force and the plunger throws out and strikes the trip finger which releases a latch on the throttle valve which causes the throttle to close instantly. The plunger normally remains clear of the trip finger by 1/16" but it moves out 5/16" while in action.

The tripping device is so arranged that the throttle can be tripped by hand at regular intervals and it is standard practice to test the trip by actually over-speeding every time the turbine is being shut down in port.

The emergency governor on 10,000 HP units is of the ring type; that is, a ring is used in place of a plunger but the operating principle is exactly the same. The ring type, however, has one advantage; it can be tripped by purposely admitting oil to a pocket in the ring. This unbalances the ring and causes it to trip the throttle at normal or below-normal running speed.

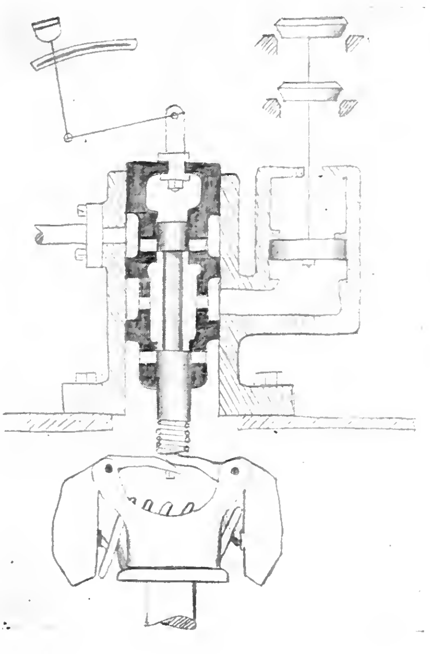
Steam Seal Regulator

Automatic controlled sealing of turbine glands is a great improvement over manual operation where hand adjustments had to be made for every change in load. The steam seal regulator is made to hold a constant pressure of 2 lbs. gauge on the high pressure and low pressure packing casing regardless of the internal pressures while maneuvering or running under way. The action of the regulator is very simple and once adjusted to operate at the correct pressure the need of re-adjustment is quite remote; in fact, these regulators might safely be made so that the original setting could not be altered. When service is called for on these regulators, they are often found to be completely out of adjustment, and correction is made by resetting the valves to the original position, which, by the way, is tram marked. The common reason for upsetting the adjustment is to provide additional sealing steam when there is difficulty in raising vacuum in port or in a loss of vacuum underway. Additional sealing steam does not improve matters. The loss is invariably due to air leakage or fouled strainers in the radojets or from a number of other causes, but for some reason the turbine glands are suspected of causing the trouble and the regulator setting is changed.

There are other features on electric drive turbines but these are secondary to the automatic control. Such features as the load limit device, and hydraulic extraction valves. A few words will be said on the more important subject of maintenance on ships where steam condition is constantly maintained on a high level.

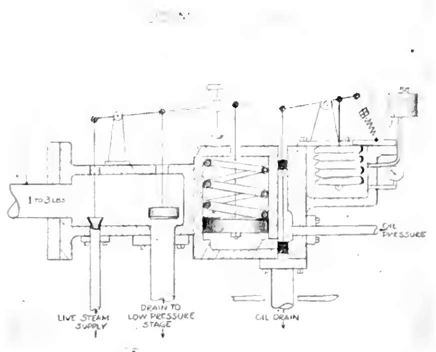
Maintenance cost on turbines is very low; in fact the

(Please turn to page 83)



Left: The governor referred to in Mr. Barr's article.

Below: The steam seal regulator.



Operating Procedures On Electric-Drive Vessels

(Continued from page 4)

the application of turbine-electric drive to Merchant Ships took place largely after 1927.

The first large passenger ship to use tubine electric drive was the S. S. *California,* completed in 1928, and her two sister ships, the S. S. *Virginia* and S. S. *Pennsylvania,* were launched soon after.

These ships, which in recent years were renamed the *Uruguay, Argentine,* and *Brazil,* are still giving reliable service as modern passenger liners.

The outstanding performance of these vessels caused other shipping companies to follow suit in the powering of their new liners and in the ensuing years, such well-known ships as the *Santa Clara, Oriente, Morro Castle, President Hoover, President Coolidge, Talamanca, Peten, Antiqua, Veragua* and *Quiriga* were launched. At the same time, much interest was shown in turbine-electric drive in Europe. Such ships as the *Normandie, Viceroy of India, Strathnaver, Strathaird* and *Rangatira* were constructed using turbine electric propulsion.

It was on all these ships and the other turbine electric vessels built during the years mentioned that the electric form of speed reduction proved itself to be better than all other types. Such qualities as flexibility in installation and operation, maneuverability, reliability, quiet operation, and unidirectional turbines made turbine electric-drive the favorite among shipowners and operators alike.

During World War II turbine electric drive was called upon when it became necessary to build ships on a mass production basis. A large fleet of electrically propelled ships were constructed, incorporating new engineering developments that improved reliability, simplified operation, reduced its size and weight, and lowered first costs and operating costs.

However, these new developments in the field of electric propulsion were not sufficient to put turbine-electric drive out in front. The shipbuilding program today indicates that turbine gear drive is again the most popular form of ship propulsion in the United States. Nevertheless there remains a large fleet of turbine-electrically propelled ships that must be operated. Gaged by present day standards, it cannot be said that the handicap that turbine electric drive now has in regards to weight, space, and efficiency is sufficient to put this form of propulsion out of the race. Electric drive is being used today for a large number of diesel-electric vessels.

The alternating current electrical system of turbine electric drive considered as a unit which consists of the generator, propelling motor, and control apparatus is not complicated from an electrical standpoint nor is it difficult for the average person to understand. The alternating current generator which is used to supply power to the propelling motor is simpler in construction than the standard DC generators with which all operating engineers are familiar. The voltage of the generator is adjusted by changing the field strength manually with a field rheostat or automatically with a voltage regulator. The power is transmitted from the generator to the motor by means of three conductors and reversal of rotation is made merely by interchanging two of the three phases by means of contactors located between the generator and motor. The control board consists of the operating levers for controlling the turbine speed, the opening and closing of the field circuits, and the reversing contactors. Also located on the control panel are the instruments for measuring the generator and motor outputs, temperature indicating equipment, and equipment protective devices. The operating levers are all mechanically interlocked so that they must be operated in proper sequence.

The propelling motor is the synchronous type with induction motor starting. Since a synchronous motor cannot be started from standstill, the motor has built into its rotor an induction motor squirrel cage winding. This winding provides torque at standstill or reversal and maintains this torque until the speed of the motor has reached its slip speed as an induction motor.

The main requisites in the handling of electrical apparatus are cleanliness, proper ventilation, lubrication, tight connections, overheating, and prevention of moisture accumulation.

Operation of Control Levers

Space does not permit a detailed discussion of all the elements of the electrical system on turbine electric propelled vessels so it is the purpose of this paper to discuss only the operating control as applied to the T2-SE-A1 and A2 tankers, the P2-SE2-R1 troopships and the P2-SE2-R3 passenger cargo vessels. What happens electrically by operation of the control levers will be explained.

Figure 1 shows schematically the bare essentials of the power and excitation circuits. The reversing lever is shown in the off position and consequently the line and field contactors are open. The propulsion generator is turning at idling speed. However, it is generating no voltage as the field circuit is open. It will be noted in this diagram that one lever operates both the reversing and field contactors which is the T2 tanker system of control. The P2 installations use the three lever system of control in which the reversing contactors and field contactors are opened and closed by means of separate levers. In the discussion that follows, the two lever systems will be described as the same functions are attained in proper sequence in either case.

Figure 2 shows what happens when the reversing and field lever is moved to the number one position ahead. On the P2 vessels this is accomplished by moving the reverser lever to the ahead position. Contactors 1, 3, 5 close and connect the motor to the generator electrically. It should be noted, however, that in this position no electrical power is yet transmitted to the motor since field has not yet been applied to the generator.

Figure 3 shows the reversing and field lever in the number two position. On the two lever systems the corresponding condition would find the field lever in the number one position. At this point the generator field contactors close and the generator is excited to about 250 per cent of normal. The resulting high generator voltage gives the motor a high starting torque and the

(Please turn to page 81)

HOW TO MAINTAIN AND REPAIR GATE AND GLOBE VALVES

By R. A. HENDRICKSON

Manager, Oil Sales, Crane Company

GOOD VALVE SERVICE consists of proper selection and installation followed by prompt maintenance and repair of leaking or damaged valves. Even the best valve cannot be expected to function properly and stay on the job if it's incorrectly installed. Nor can it be expected to stand up very long after it develops a seep or a leak.

After valves have been properly selected and installed, their maintenance can be reduced by a surprising amount through periodic inspection. Service conditions and frequency of operation will determine the frequency of inspections. But once the interval of valve inspection has been established it should be made regularly and systematically. When routine valve inspection discloses leakage, steps should be taken immediately to correct the trouble before the valve is damaged beyond repair.

Stuffing Box Leaks

Stuffing box leakage is one of the most common troubles encountered in valves. It usually happens when improper packing is used or when packing is worn. Leaks may be evidenced by steam "flags", by unaccountable presence of moisture on piping or valve bodies, or by outright dripping. Leaks should be attended to immediately when discovered. Don't hesitate to break into insulation if a leak is suspected underneath. Such hidden leaks are especially damaging to bolts, pipe and flanges. All leaks are conducive to corrosion.

If it is necessary to hunt a leak under pipe insulation, it is suggested, for a minimum of damage to the insulation, that a puncture be made with a wire at the point of suspicion, permitting leakage to escape. Another practical method is to insert a pipe nipple through the insulation at each flange joint. Drainage from the nipples will indicate leakage in the line.

Neglected stuffing-box leaks will eventually damage valve stems. Most stuffing-box leaks can be stopped simply by pulling up the packing bolts, or by tightening the valve gland nut. Be sure to tighten bolts evenly. If tightening the packing gland does not stop leaking, it is

Illustration 1

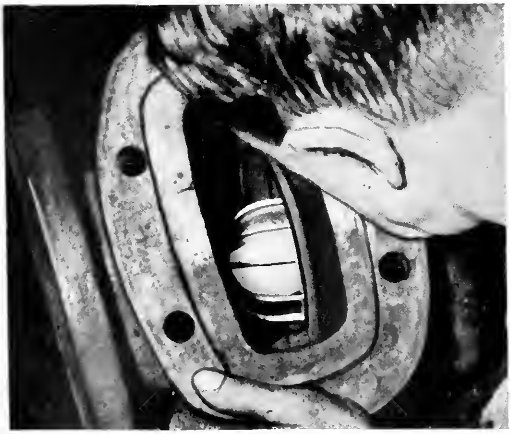


Illustration 2

Illustration 3

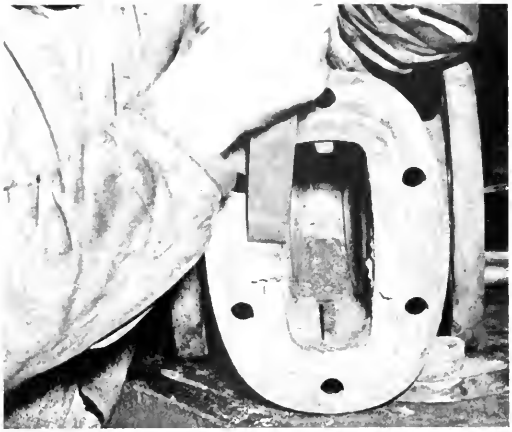


Illustration 4

a simple matter to replace the packing. To repack, loosen all stuffing-box parts and remove the old packing, using a bent wire or other hook to clean the box thoroughly. Insert the new packing and tamp it well into place. Add a few drops of oil between layers to help work in the new material. If ring packing is used, be sure to stagger the ring splits, so that they are not all in line.

Gasket Leaks

If a leak is allowed to continue at a bonnet joint or a flange joint, it is not just the gasket that suffers. The joint faces are soon ruined. If bolt take-up does not cure a joint leak, replace the gasket immediately. The type of gasket material to be used is important. Gaskets are of three general types; flat ring gaskets which cover the face of the flange to the inside of the bolt holes, full-face gaskets through which the flange bolts pass, and metal rings of elliptical cross-section fitting into machined grooves in flanges. Gasket materials comprise rubber, asbestos composition and soft metals. Rubber gaskets are generally used for low pressures at normal temperature. As pressures increase, and for hot service up to 750 degrees F, asbestos compositions are frequently used. Metallic gaskets are extensively used when steel valves are installed.

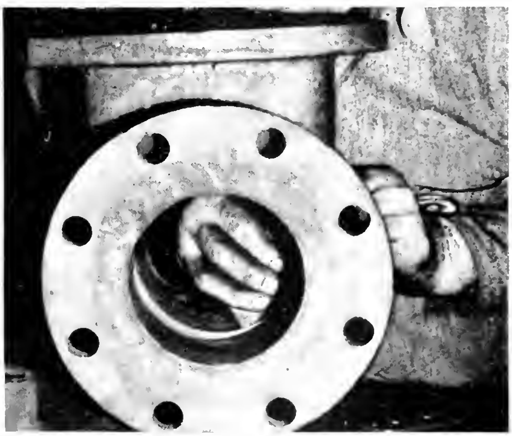
Variations in gasket materials are so wide, however, that manufacturers' recommendations should be consulted before the material to be used is selected. Various types of gaskets take different treatments before they are inserted in the joints.

Repair of Seat Leaks

If a valve cannot be shut off tightly, the cause of the trouble should be investigated without delay. If a leak is neglected, the seating surfaces may be soon damaged to the extent that replacement of parts or of the complete

Illustration 5

Illustration 6



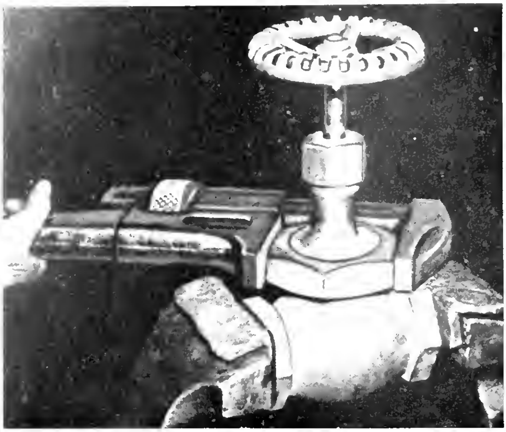


Illustration 1A

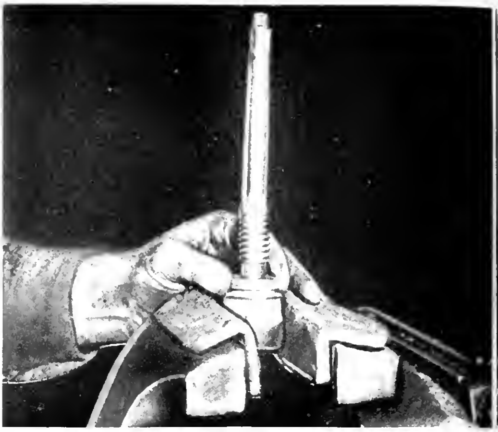


Illustration 2A

valve may be necessary.

When a leaky gate valve is discovered, remove the bonnet and examine the disc and body thoroughly to determine the extent of damage to body rings and disc. (Illustration #1) If corrosion has caused excessive pitting or eating away of metal as in the case of guide ribs in body, it may be impractical to attempt repairs. A complete check-up and servicing of all parts of valve is recommended. Remove the stem from the bonnet and examine it for scoring and pitting where the packing contacts the stem. Light polishing with fine emery cloth is all that may be needed to put the stem in good condition. (Illustration #2)

Remove all packing and thoroughly clean the stuffing box. (Illustration #3) At the same time clean inside of valve bonnet and other parts to remove all dirt, scale, corrosion, etc., so that the interior of valve will be free of all foreign particles. If valve has a flat gasket it should be removed completely and replaced with one of proper material and size. (Illustration #4)

If ring type joint is used, the oval or octagonal metal ring can be cleaned, and if not pitted, can be used again. After completing the cleaning and examining of all parts and it is found possible to repair the valve by refinishing disc and body seat rings or by replacement of body seat rings, proceed as follows:

Place disc in vise with seat face up. (Illustration #5)

Wrap piece of fine emery cloth around a flat tool and rub or lap the entire bearing surface, (both sides of disc) to a smooth even finish. Remove as little as possible. The usual cuts and scratches found on body seat rings can also be repaired by lapping. Use an emery block small

Illustration 3A

Illustration 4A

Illustration 5A

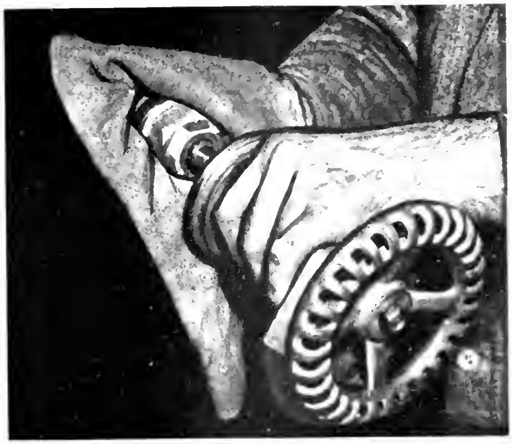


Illustration 6A

enough to permit rubbing of seat ring faces all around. (Illustration #6)

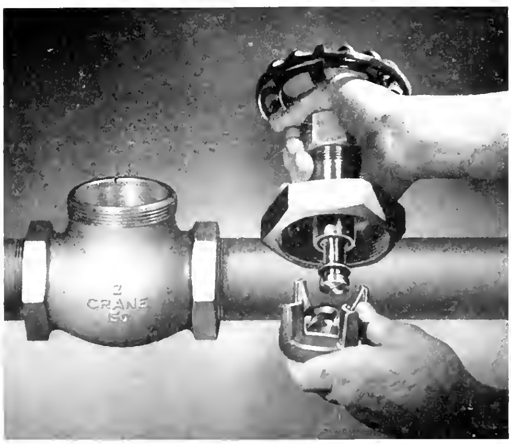
Work carefully and watch closely. Avoid removal of too much metal to prevent disc seating too low. When seating surfaces (discs and body seat rings) seem to be properly lapped, coat face of disc with Prussian Blue and drop it into the body to check the bearing. When a good continuous contact is obtained between the disc and body seat ring face, the valve will be tight and is now ready for reassembly. When assembling, insert stem in the bonnet. Install new packing. Assemble other parts including gland and gland flange, and then attach the disc to the stem. Replace bonnet gasket, and place the complete assembly in the body. Lift the disc off the body seat ring face so that the bonnet can be properly seated on the body before tightening the bolts. Pull bonnet bolts up evenly in pairs diametrically opposite each other. Good practice suggests testing repaired valve before putting back in service. This assures that repairs have been properly made and stuffing box is tight.

When body seat rings in gate valves must be replaced, they can be removed and replaced best with a power lathe. Chuck the body with rings vertical so that seat faces will be parallel with face plate. Use a steel bar across the body ring lugs to unscrew them. Removal of rings can be accomplished by hand by means of a cold chisel or hack saw to split the ring and then collapse it. Extreme caution should be taken so that the body ring threads in the body are not damaged. New rings must be pulled up tight against the shoulder on the ring so that leakage will not occur around the body ring. To tighten, place a steel bar

(Please turn to page 82)

Illustration 1B

Illustration 2B



Submarine Naval Architecture

(Continued from September issue)

by A. I. McKee

Stability

In the surface condition, a submarine is a surface ship and there is nothing unusual about her stability except that she has very little freeboard and a pronounced tumble home, neither of which is conducive to a good range of stability.

In the submerged conditions there is no waterplane, so the only way stability can be obtained is by keeping the center of gravity below the center of buoyancy. It is not surprising to find that the GM in this condition is so small as to be measured in inches rather than in feet. This low position of the center of gravity gives a very satisfactory range of stability in the surface condition in spite of the unfavorable shape of the above water body.

The longitudinal metacentric height is ordinarily not a matter of much concern to a naval architect. He calculates it, of course, in order that he may determine the trim of the ship in various conditions. But when a submarine is submerged and the water plane disappears, the longitudinal metacentric height also almost disappears. It is this lack of longitudinal stability that makes it necessary to be so careful about the longitudinal position of the center of gravity and to provide means for full compensation for the longitudinal moment of changes in weight.

As stability is so dependent on a low position of the center of gravity of the ship, the lead ballast mentioned above is always placed as low as practicable in the ship. Usually it is not possible to use all the lead to compensate for permanent increases in weight, for the removal of all of it to compensate for weights added higher in the ship would reduce the stability to an unacceptable degree.

While a submarine is submerging or surfacing, there is a large free surface in the ballast tanks and the stability is greatly reduced. On many submarines the GM has become negative. This is of no importance while the ship is submerging for it lasts only 10 or 15 seconds and the ship has no time to take a list. In surfacing, however, the free surface lasts for 15 or 20 minutes and negative stability requires that some means for controlling and correcting list during this period be provided. There is no advantage in making the vertical keel watertight in an attempt to separate the two sides into two separate tanks, as the main ballast tanks have large flooding holes in the bottom and are always connected together through the sea. The vents can be separate, however, for each side. Then the two sides are cross connected only through the air lines while the water is being blown from them. By providing a list control valve in the air lines the ship can be kept balanced in an upright position, even though she is actually unstable. In the past, however, we have had some submarines on which instability was troublesome although not dangerous. One that I remember could not be brought to the surface without assuming a large list.

Strength Calculations

The Submarine Naval Architect must give a great deal of thought to the transverse shape and strength of the ship in order to enable it to withstand an external pressure of several hundred pounds to the square inch. He makes every effort to make the transverse sections of the part of the structure which is subjected to sea pressure circular in shape. This not only gives the greatest ratio of strength to weight, but it also gives the designer a happier feeling, for he can predict the strength of a circular section with much greater accuracy than he can that of a non-circular section. The non-circular sections require elaborate calculations whose accuracy depends on the correctness of certain assumptions which must be made even though some doubt exists as to whether the assumptions are strictly accurate. The designer prefers to provide some margin in the structure of these frames, rather than to use only the minimum of material which the calculations require.

When a change in the type of structure or a material change in scantlings is contemplated, it is customary to make and test to destruction one or more models of the structure. The models are of limited length and have been built to various scales from full size to 3/40 size, always geometrically similar to the part of the ship under study. Once the scale factors had been established with certainty, it became possible to make the models of very small size and to make the tests at small cost and with complete confidence in the data obtained.

Because of the high water pressure to which the ship is subjected, it is necessary to calculate very carefully the strength of bulkheads, hatch trunks, and all fittings which must withstand sea pressure. The formulae used for bulkheads have been derived from tests of generally similar structures, both in full size and to reduced scale.

On the other hand, the longitudinal strength requires serious thought only in the case of very large submarines. No calculations of longitudinal strength are ordinarily made for submarines of the size we have been building in recent years.

Diving

It has been mentioned that when a submarine is operating on the surface, her displacement and trim must be

(Please turn to page 86)

Pacific WORLD TRADE
Reg. U. S. Pat. Off.

Imports Needed for Strategic Stock Pile

A list of 30 strategic materials, essential to stockpiling for the nation's military security, was made public August 24 by Earl Bunting, Managing Director of the National Association of Manufacturers, which is cooperating with the Munitions Board in accelerating the stockpiling program.

On the list, not necessarily in order of importance, are rubber, lead, castor oil, cadmium, coconut oil, copper, manganese, palm oil, quinidine, shellac, zinc, cordage fibers, mica, asbestos, bauxite, beryl, bismuth, chromite, columbite, corundum, industrial diamonds, graphite, kyanite, monazite, nickel, pepper, talc, tin, tungsten and vanadium.

Under an industry-assistance plan, formulated by Thomas J. Hargrave, Munitions Board chairman, and Mr. Bunting, procurement of the critical items will be stepped up through the cooperation of industries which import, produce or process the needed materials. These industries are being asked to obtain for the government a certain percentage in excess of their normal supply.

While a total of 67 materials are included in the "Group A" list of stockpile items, the Munitions Board requested industry action at this time only on the 30 items announced. "Group A," according to the Munitions Board, comprises those strategic items for which stockpiling "is deemed the only satisfactory means of insuring an adequate supply for a future emergency."

Strategic and critical materials grouped as "B" and "C" are recommended for stockpiling only under certain conditions, governed in part by adequacy of supply and practicability of storage. The Munitions Board notes that "materials in all three groups are subject to constant surveillance and review."

Changing Conditions in Colombia

At a recent meeting of the Junior Foreign Trade Association of Southern California, Robert Gildred of Gilco Trading Company, spoke on Colombian affairs, based on his personal experiences through dealing with this important South American country over a period of many years.

Gildred has just completed a survey of this area, and states that prior to the war business was conducted on a "fiesta and siesta" basis, whereas now there is a distinct reversal of this custom, and in addition to requiring immediate action on transactions, there is universal unrest, dissatisfaction and conflict. This has been brought about by the institution of rigid import controls, highly inflated costs, political conflicts within the government, strikes and labor problems, and the inadequate results, from their viewpoint of the Pan American Conference, culminated by the Communist inspired revolt of April 9. Mr. Gildred believes that it will require a minimum of two years before we can expect any semblance of a return to normalcy or improvement in the internal Colombian situation.

New Type Export License Adopted

Immediate adoption of an entirely new type of export license which reduces the possibility of counterfeiting to a minimum was announced recently by the Department of Commerce through its OIT.

The new license incorporates several protective features in design, preparation, validation, and use. The key to the series of safeguards being put into effect is a unique forgery-proof paper. Its adaptation in the new type export license, together with the specially designed validating machines which were recently put into use, provides a considerable measure of insurance against illicit dealings in forged and duplicated documents. The new license will be prepared in its entirety within OIT, in a specially designed and distinctive type face.

Use of the safety paper license (Form IT-628) will, for the time being, be restricted to authorizations for the export of items on the positive list. The familiar Form IT-419 license will continue until further notice to be used when authorization is granted for shipment of non-positive list commodities to destinations in Group R. All license applications, however, will continue to be made on Form IT-419 in duplicate, and must be accompanied by the standard acknowledgment card, Form IT-116.

New Applications for Foreign Trade Zones

Los Angeles

The long fight for establishment of a Foreign Trade Zone at Los Angeles Harbor is nearing a climax in Washington, D. C., since the formal application for its establishment has been completed and forwarded to the Department of Commerce in Washington, D. C., for action by the department's Foreign Trade Zones Board.

Signed by Arthur Eldridge, general manager of the Los Angeles Harbor Department, in the presence of four of the five commissioners, the application and its three-inch book of supporting briefs seeks establishment of the so-called "Free Trade Zone" in the port at Pier No. 1, at the entrance to Main Channel from Outer Harbor.

It is expected that favorable action will be taken within five months.

According to the brief, berth 60 will be used for the Foreign Trade Zone. The wharf and shed at berth 60 and an eastern tier of rooms on the first floor of warehouse No. 1 will be utilized for the free zone. A water area 75 by 682 feet in front of berth 60 will initially be set aside for the zone.

A free zone survey, dated October 15, 1947, compiled by Charles T. Leeds and Gerald C. Fetzergerald, Los Angeles consulting engineers, was based on replies to questionnaires sent to 2022 importers, exporters, bankers, manufacturers, merchandisers, steamship operators, warehousemen, customs brokers and trade associations.

Seattle

Formal application for a Seattle Foreign Trade Zone was mailed August 31 to the Federal Foreign Trade Zone Committee in Washington, D. C., by the Port of Seattle Commission.

With only three zones now in operation in the United States, at New York, New Orleans and San Francisco, the Port application represents two years of intensive survey and analysis to determine the economic feasibility of establishing such a zone in Seattle.

A special survey was conducted by Charles J. Miller, professor of marketing at the University of Washington and chairman of the Chamber of Commerce's Foreign Trade Zone Committee. Started during the war years, this report was published jointly by the Port of Seattle and state Department of Conservation and Development. It has drawn increasingly heavy support of the zone from local and area-wide industry.

According to J. A. Earley, president of the Port of Seattle Commission, the Port anticipates a wait of approximately three months for federal approval of the application. He added, however, that the proposed zone has already won favorable comment from federal officials and ultimate okay is expected to be a formal routine.

Proposed site of the zone, where dutiable imports may be landed and processed before going through customs, is a section of the Port of Seattle's East Waterway Terminal.

Four of the five Los Angeles Harbor Commissioners smile their approval while Arthur Eldridge, General Manager, formally signs the application of the Port of Los Angeles for a Foreign Trade Zone to be established at the $1,-500,000 Municipal Warehouse No. 1 situated at the entrance of the main channel. Left to right, Commissioners Harold W. Tuttle, Roy Beaton, Kenneth Chantry and President of the Commission, C. S. Sampson.

Port of Seattle files application for a Foreign Trade Zone on the Seattle waterfront. Inspecting presentation accompanying the application are, seated: J. A. Earley, president of the Port of Seattle Commission; standing, left to right: E. H. Savage, Vice-President of the Port Commission; Charles J. Miller, professor of marketing at the University of Washington and chairman of the Chamber of Commerce's Foreign Trade Zone Committee; and A. B. Terry, Port Commission secretary.

Latin American Credit Collections

The San Francisco office of the Department of Commerce reports a slight improvement, on the whole, in the promptness of American export collections paid by Latin American countries. This was the first indication of any improvement in Latin American collections since last February.

Of the total number of collections paid to the twelve reporting banks during August, 49.7 per cent were prompt as against 47.6 per cent in July, and 20.6 per cent were over 90 days slow, compared with 27.5 per cent in July. The dollar value of outstanding collections had fallen at the end of August to 114 million dollars, a decrease of 5 million dollars from the previous month-end and of 29 million dollars from the end of May 1948.

The most noticeable improvement in the promptness of collections occurred in Chile. Other Latin American countries that showed some improvement during August were Brazil, Costa Rica, Ecuador, Paraguay, and Peru. Brazil and Costa Rica, however, still lead in the slowness of payments with 62.5 and 77.3 per cent, respectively, of their payments in the "over 90 days slow" category. Nevertheless, both of these countries have been steadily reducing the backlog of their outstanding collections during the past few months. No clear evidence of the effect of the devaluation of the Mexican peso on draft collections in Mexico was visible during August.

These statements are taken from a release of the Federal Reserve Bank of New York in accordance with information collected from twelve large New York City banks.

New U. S. Ships Stimulate Trade on African Run

In a volume that is steadily increasing, a wide variety of cargoes including asbestos and zebras, gold and ivory tusks, cocoa and chrome, are shipped to this country from Africa.

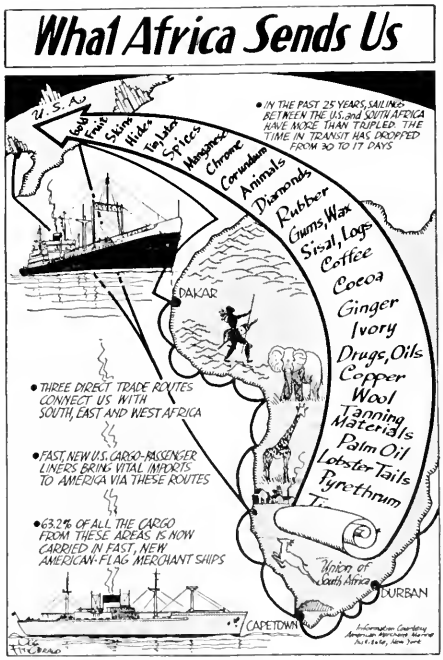
Assisting in the growth of this trade are American-flag steamship lines that serve three direct routes to South, East and West Africa from Atlantic and Gulf ports. American ships on these routes have been responsible for cutting the transit time from 30 days to 17 days and for tripling the number of sailings, according to the American Merchant Marine Institute.

One of the few trade areas where U. S. imports are greater than exports, Africa is important to American economy and industry because it is a chief source for a number of essential products. From Africa's steaming Gold Coast comes most of our cocoa while East and South Africa are the foremost suppliers of valuable chrome ore. Other highly useful imports are manganese, wool, copper, tin and hides and skins of all types.

The war has brought many changes to Africa. Today, war-built landing craft of several varieties serve as feeders to huge freighters which can berth only at the few good harbors. These LCT's also help distribute incoming cargoes to hundreds of out-of-the-way inlets and settlements.

The importance of Africa to our standard of living and defense has been substantially heightened as a result of the war. Indicative of this is the increased number of sailings scheduled by the Maritime Commission for its three "essential" trade routes to Africa. Whereas 25 ships of slower speed sufficed in 1939, 45 of the newer, faster types are now operating.

There are plans for four passenger vessels to handle the greatly increased demand for space by travelers and business men. Two C-3 vessels are to be converted, each to carry 61 while two 8,000 gross ton liners of 19 knots with a capacity of 300 each, are contemplated by the Maritime Commission. At present, freighters with accommodations for 12 furnish the only passenger service.



60-Ton Engine for Export

A 60-ton diesel engine, manufactured by the Union Diesel Engine Company of Oakland being loaded at the Ninth Avenue Terminal of the Port of Oakland for shipment to the Orient. The engine, which was sold to the Base Metals Corporation of America, was transferred from the dock by a giant Haviside derrick barge. It was one of several diesels being delivered to companies in the Orient for installation in large ocean going tugs.

Making ECA Shipments

Plans for placing stars and stripes emblems on recovery goods shipped to Europe under Economic Cooperation Administration financing were announced by the ECA. Designed to emphasize to peoples of the nations participating in the European Recovery Program that recovery goods are being supplied by the United States, the emblem bears the phrase:

FOR EUROPEAN RECOVERY
supplied by the
UNITED STATES OF AMERICA

The phrase will appear, wherever practicable, on shipping cases, boxes, crates, barrels, bales, bags and other packaging as well as the goods themselves. The emblem design is a shield composed of four white stars on a blue background above 13 vertical red and white stripes. The lettering appears between the stars and stripes.

Pacific WORLD TRADE

Indies Exports Now Exceeding Imports

Exports from Indonesia for April and May 1948, exceeded imports by approximately 2,600,000 and 3,000,000 U. S. dollars respectively, according to the latest figures released by the Department of Economic Affairs of the Provisional Federal Government of Indonesia. The figures were released through the Netherlands Information Bureau's Western Division.

Subsequent figures indicate the continuation of the trend in the increased ratio of exports over imports. Last January the trade balance was unfavorable with a deficit estimated at some $2,500,000.

The United States has received the largest share of Indies products next to the Netherlands.

Following are major May and June Indies exports in quantities and value:

	May		June	
	Long Tons	million US dollars	Long tons	million US dollars
Rubber	22,637	10	27,558	10
Copra	23,621	6	26,574	7
Petroleum Prod.	323,805	7	292,310	7
Tin—tin ore	4,331	5	3,691	4
Palm oil	....	...	2,715	1
Sugar	4,572	0.6	7,567	0.8
Tea	984	1	446	0.7
Kapok	719	0.4	704	0.4

Port of Long Beach Booklet

The Port of Long Beach, California, has published an illustrated booklet covering all activities of the Port. The booklet is divided into six sections: Story of the Port; Value of the Port to the Community; Petroleum Activities of the Port; Map of the Port; Oil and Operating Revenues of the Port; Facilities of the Port.

Story of the Port includes a resume of the Port's colorful history dating back to 1542, the Port as it stands today, and plans for its future development.

The pictorial brochure, which contains 53 photographs, charts and illustrations, outlines future developments which will cost approximately $100 million when completed. Among projects contemplated for the future are a grain elevator and a refrigerated warehouse, two facilities which do not exist at present in Southern California ports. Provision will be made for a minimum of 85 large ship berths, 36 modern transit sheds, 12 warehouses, plus large area of shipside open storage space.

Little development of the port took place until 1938 when the port first began to derive revenue from municipal oil wells located in the Harbor District. Since that time, in the short span of only ten years, the port has developed rapidly and now has some of the finest shipping facilities available, with 85,280 linear feet of existing deep water frontage including municipal, federal and private with a 40-foot minimum depth of water at low tide. All permanent utilities systems in the Outer Harbor are underground, eliminating danger to high cargo handling equipment. There are 22 miles of municipal railroad trackage with a classification yard in the rear of Pier A with a capacity of 200 railway cars. For truck cargoes, wide paved highways lead to all piers and transit sheds.

Marine Insurance

Magnetic Mines

The Merchant Marine Council announces that since the end of World War II, more than 250 ships of all nations have been sunk or damaged by mines. Of this number, 43 United States ships have been affected. It is estimated that sweeping operations in Europe and the Far East will take at least another year. Authorities are agreed that no guaranty can be given that even after all the sweepers have ceased operations, a mine will not pop up from time to time in the next 20 years. In July of 1947 a World War I mine was reported off Cape May, N. J.

Information has recently been released indicating that the life of British magnetic ground mines laid during the war is in excess of the 3½-year period which has been accepted to date. It appears that a life of 8 to 12 years will now have to be allowed for these mines, and as a result the following policy has been approved. Shipping is to continue to use swept buoyed channels until it is considered that all mines have become inactive due to age. Annual trial sweep will be conducted of a chosen area to find out when mines become inactive due to age. Certain routes and channels will be amended and widened as may be possible with available minesweeping forces.

Just recently a small Danish coastal excursion vessel was destroped in the Kattegat, with a reported loss of 200 lives, as a result of a floating mine. Statistics released by a New York war-risk insurance authority reveal that a total of 251 ships of all nationalities have struck mines since VE-day in the Atlantic and Mediterranean and since VJ-day in the Pacific. Of this number, 116 were either sunk or declared a total loss.

Although the danger from mines has not yet been eliminated, an international effort by all nations with naval minesweeping facilities has been undertaken. Swept channels are thus established and maintained and are marked with buoys.

All mine information for the Pacific area is gathered and distributed by the Branch Hydrographic office at Honolulu while similar information in the European and Atlantic area is centralized in London and is distributed through an international committee known as the International Routing and Reporting Authority. Information on mines and mined areas is broadcast by radio and is given wide distribution.

In most cases of casualties reported, the ships had strayed from the limits of swept channels or had entered a minefield through which no safe channel had yet been swept. Section 62.27a, General Rules and Regulations for Vessel Inspection, Ocean and Coastwise, is quoted for information: "Due to existing mine field dangers, all licensed masters, officers, and certificated seamen on United States vessels shall comply strictly with the routing instructions issued by competent naval authority. Failure to comply with such routing instructions shall be deemed misconduct within the meaning of R. S. 4450, as amended (46 U. C. C. 239). Nothing herein shall be construed as relieving the master of the responsibility for the safety of his vessel."

Pilferage

Pilferage shows no sign of a decline. The University of Liverpool, which is carrying out an investigation into the extent of pilferage and methods for its prevention, has asked for the co-operation of public departments, commercial interests and the business community in general in making available more precise information than it has hitherto been possible to obtain. In this factual inquiry the co-operation of the Chamber of Shipping of the United Kingdom has been sought. In addition, the Ministry of Food is setting up committees in the main centres to examine the question of pilferage of

(Please turn to page 96)

Ira B. Chapman

Port Engineer of the Month

--With The

SAN FRANCISCO

IRA B. CHAPMAN

Of American President Lines

A licensed marine engineer since 1929, Ira B. Chapman first joined American President Lines in March 1942 as First Assistant Engineer on the *Cape Perpetua*, and later was advanced to Chief Engineer of the same vessel.

Chapman also was Chief Engineer of two other APL ships during World War II. In August, 1944 he directed the Engine Department on the *Sea Partridge* and in June, 1945 was assigned to the *Marine Cardinal*.

On July 12, 1945 Chapman came ashore as assistant port engineer for APL at San Francisco, a position he still holds. He served first under John Jacobsen and now serves under George Jackson, successor to Jacobsen when Jacobsen retired.

Chapman was born in Alameda, Cal., March 19, 1905 and still resides there. He is a small boat enthusiast.

San Francisco Meeting

At the September meeting of the San Francisco Society, Mr. George Barr and Mr. Hughes Ogilvie spoke on the operation, control and maintenance of marine turbines. A review of their talks may be found on page 47 of this issue.

Below, left to right: Hughes Ogilvie, Phil Thearle and George Barr.

Port Engineers-

Los Angeles Meeting

Mr. C. C. Moore, Union Oil Company Research Supervisor, presented a lecture on turbine lubrication at the Los Angeles Society's September meeting. Above picture shows some of the members at dinner and picture at lower left shows Mr. Moore presenting his talk.

Lower right, left to right: Roy C. Ingram, Union Oil Company; Robert Ingram; Tommy Ott, Union Oil Company (retired); C. C. Moore, Union Oil Company, speaker.

Dan Dobler

Port Engineer of the Month

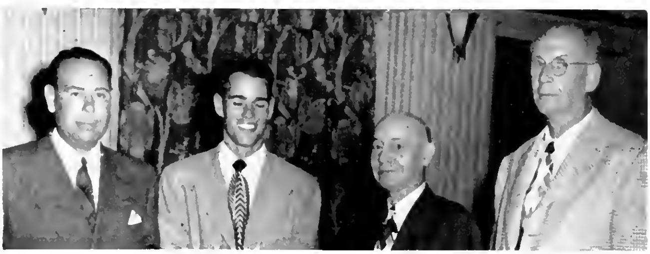
LOS ANGELES
DAN DOBLER
Of The Texas Company

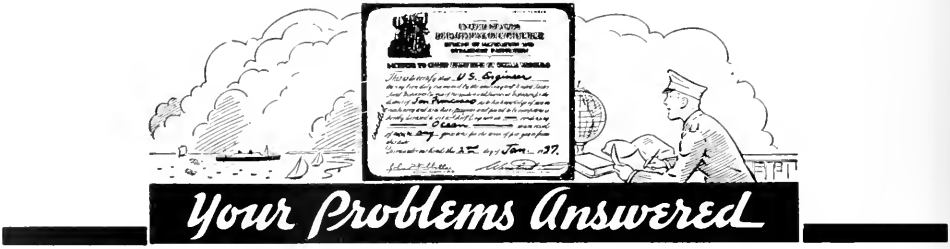
Born in Dubuque, Iowa, where he could view the scenery of three states, Iowa, Wisconsin and Illinois, and the Mississippi River, Dan served his apprenticeship as an embryo marine engineer in the local railroad shops.

The lust of travel in his blood, the Yukon River beckoned him for a few years, then the oceans, and he finally acquired a Chief Engineer's certificate for all tonnage, steam and diesel. Following two years as inspector for the U. S. Shipping Board in Seattle after World War I, he went to sea again, and later came ashore in New Orleans as marine surveyor for the U. S. Bureau of Survey, then as port superintendent for the Tampa Inter-Ocean Steamship Company for a period of eight years. The lure of the Golden State resulted in his employment with the California Petroleum Steamship Corporation in February 1927, continuing to the present time. He is now marine superintendent.

Dan served as chairman of the Board of Governors of the Los Angeles Society when it was organized last year.

Home gardening and ships are his special interests.





by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

APPLIED MATHEMATICS

THE EXPONENT

THIS department is devoted to the interests of the marine engineer and many conferences and much thought has been given as to what shall go into the column. It is agreed that the most valuable things we could give to the marine engineer are experience, feel for machines, and engineering know-how. Only the job and responsibility can develop these characteristics. However, the next in importance is the ability to think, analyze and reach conclusions that are logical and reasonable. There is no better method of developing logic and analytical powers than mathematical reasoning. It is pure logic, and mathematical logic is something that can be covered in these columns. The value of a man to his ship, himself and his future is in direct proportion to his ability to reason, analyze and make correct logical hard-headed decisions. The Chief believes he can do more good for his engineering readers by encouraging them in mathematics.

In introducing the subject of exponents, it is not with the idea that the Marine Engineer will have use for them on the job. He will, however, be interested in the fact that many of the facts and tabulations that he does use are founded on the mathematical conclusions derived from the exponential expression. The following are only some of the useful things given us by the theory of the exponent:

—Wire size tables and gages.
—Logarithms and tables used in navigation.
—A system for expressing large numbers.
—The decibel system of ratios.
—The slide rule for quick calculations.
—The log and log-plotting scales for curves.
—A new language without which innumerable common engineering procedures and conclusions would be hopeless.

We therefore propose to introduce, in succeeding articles, the several uses of this branch of mathematics.

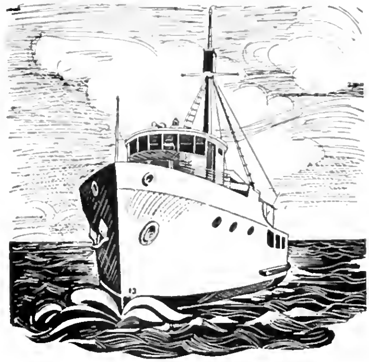
We use numbers, letters in the English and Greek alphabet, and other symbols such as #, $, &, *, @, ', ", and so on to express ideas. These are a part of our written language. But even if we never had to write anything down we would still need symbols to express ideas. This is because we think in symbols. The sign language used between people who do not understand each other's language can be used only because there are things which naturally symbolize ideas. Some of these are the sun to express a day and the moon to express a month or the night time. By explaining and agreeing on symbols in advance we can express ideas as complicated and advanced as we can comprehend. We can go to the limits of our minds to understand. This process of symbolizing between teacher (or author) and student is the process of education.

The number 7 symbolizes something in the reader's mind but it is not specific. This is true of all numbers and letters as symbols. This number 7 reminds the wipers in the engine room perhaps of a lucky (or unlucky) turn of the dice in a crap game. The bartender thinks of a lime flavored mixer. To each of us it means something different. Symbols, therefore, have no meaning unless a meaning is assigned to them, usually objects or dimensions such as units of length, weight, or time.

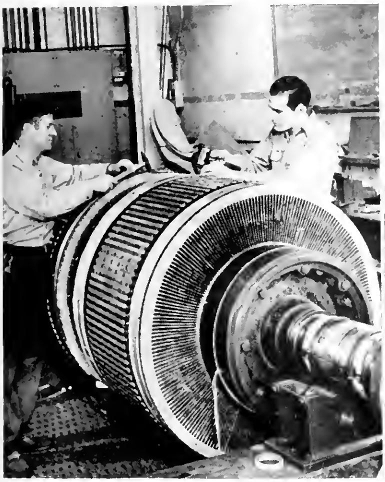
The mathematician, however, shows us how to combine these non-specific symbols together to obtain new, interesting, useful and valuable conclusions which are true. These new conclusions, however, are not specific nor useful until the symbols and numbers are assigned meanings, and furthermore it is imperative that the same meanings are used throughout the entire mathematical process. This process of assigning dimensional meanings to all the symbols in a line of mathematical reasoning is called dimensional analysis. Thus the volume of a cylindrical tank L feet long and D inches diameter

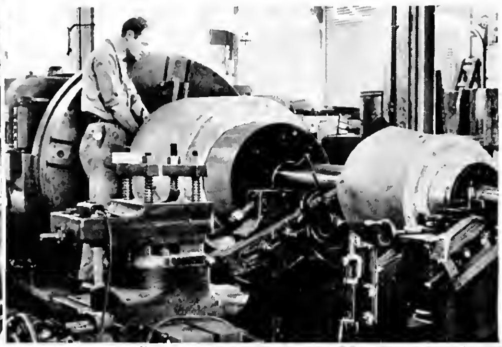
(Please turn to page 88)

Coast Commercial Craft



"Alaska Standard" Back in Service





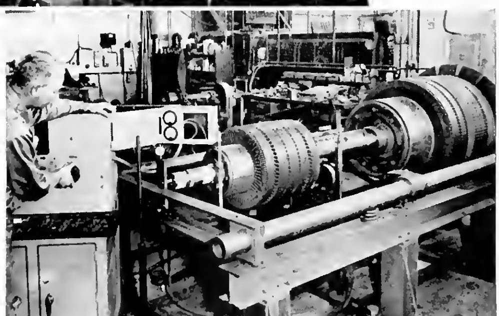
Left: Two General Electric technicians wood wedging the two 300 HP armatures, before soldering the armature bars to the commutator risers.

Below: Technician setting up commutators in 60-inch lathe, prior to turning and grinding.

Bottom: Technician dynamically balancing the combined generator and exciter armature as a unit.

BACK IN SERVICE again after its first major overhaul in 24 years of supplying southeastern Alaskan ports and canneries with petroleum products, the *Alaska Standard* has been stepped up both in speed and power. The original electric propulsion equipment, which powered the ship through nearly a million nautical miles of service, has undergone a complete overhaul and reconditioning in General Electric's San Francisco Service Shop.

The unusual 210-foot "floating service station," one of the best known and most popular of ships in Alaskan waters, has been keeping families and industries of the area in heat, light and power since its commissioning



Pictures taken in General Electric's San Francisco Service Shop.

The Alaska Standard leaving Sitka, Alaska. A ship-to-shore radio simplifies and speeds deliveries. A control rheostat gives "pilot house control" of tanker's G-E diesel electric propulsion.

in 1923.

Shut off from the rest of the world by high mountain ranges, uninhabited flatlands and miles of ocean, Alaska is largely dependent for its supplies on waterborn vessels which represent its major contacts with the world "outside."

Large supply depots have been established at Juneau, Ketchikan, Seward and Dutch Harbor by Standard Oil of California, but the single-screw *Alaska Standard* is the "peddler" that provides the personalized service to many Alaskan ports and canneries.

Supplying Alaskan petroleum users is not a simple task. The seafood canneries that line the coast use large quantities and various types of petroleum products for continuous operation during fishing seasons. Fishing boats keep their engines turning over day and night without stop when the salmon are running, and oil stoves are often in use for months at a time during the long arctic winter. Trucks pushing forward over the Alaskan and Richardson Highways need gasoline and diesel fuel. On top of these vital needs is the constant demand for special fuel for pressure lanterns, fly sprays, starting fluids, greases and rust preventatives. All of these are part of the *Alaska Standard's* stock in trade on its regular trips into the bays and inlets. They are sold on the dock to the fishermen, trappers, storekeepers and missionaries by the oil salesman who travels on the tanker in the summer.

After nearly a quarter of a century of this service, the *Alaska Standard*, powered by diesel-electric drive, recently put into the Moore Drydock Co. at Oakland, California for its first major overhaul. G-E marine service engineers went aboard to supervise reconditioning of its two 245-kw, d-c generators, two 300-hp motors and other electrical equipment.

Motors and generators were removed and sent to the G-E Service Shop where they were dismantled and the generator shafts removed. Propulsion armatures were cleaned, rewound, rebanded and modified to increase speed and horsepower (265 to 315 rpm). The armatures were then dipped, baked and pressed on new shafts and dynamically balanced. Coils were stripped, cleaned, rewound and reinsulated with mica-glass. Copper bars were cleaned and retaped, the commutators were turned and polished and the slots were undercut. Brush holders were reinsulated and chemically cleaned. New collars were installed on both the field and commutating coils and were sprayed with Glyptal lacquer.

On board the ship, marine service engineers cleaned and completely overhauled the propulsion switchboard and field rheostats. When the motors and generarors were reassembled they were lowered back into place rhrough the engine room hatch.

Dock trials and sea trials were passed with flying colors, and with a final swing to square away its compass, the *Alaska Standard* headed back into the Arctic to continue its vital service.

Society of Naval Architects Will Meet

On October 26 the combined Pacific Coast Sections of Naval Architects and Marine Engineers will hold an all-day meeting at Mare Island Navy Yard, Vallejo, California. Members of the Society and their guests will have an opportunity to see the very latest practices in the art of shipbuilding and ship repair. Four outstanding papers will be read and discussed, covering the subjects of naval architecture and industrial management as pertaining to maritime interests.

The day's schedule includes a tour of the Shipyard and visit to specific shops, lunch at the Officers' Mess, meeting of the Society at which the four papers will be read, and a showing of special motion pictures in the evening. The pictures to be shown are "Silent Service", a color sound film showing action scenes of the submarine service during the war; "The Atom Strikes", black and white sound film showing Hiroshima and Nagasaki after dropping of the atomic bombs; and "Sea Power in the Pacific", black and white sound film showing the role of the Navy in the Pacific War.

Mexican musicians took part in the colorful ceremonies at the simultaneous launching of four shrimp trawlers at National Iron Works.

Quadruple Launching

In a scene reminiscent of wartime shipbuilding activities, the first multiple launching in the history of San Diego harbor took place at the National Iron Works shipyards on Saturday, July 24, when four vessels were launched simultaneously.

The vessels, 48-foot shrimp trawlers, were built for Products Congelados, Guaymas, Sonora, Mexico, and are scheduled to go into immediate service in Mexican waters, according to Hernando De Cima, general manager of the Mexican concern, the largest shrimp shipping firm in the southern Republic.

The trawlers will catch shrimp for two huge freezer plants in Guaymas, Sonora; and Reform, Sinaloa, De Cima said. They represent a total investment of approximately $150,000.

The new trawlers (the *Juan Francisco*, the *Santa Clara*, the *Barca de Oro*, and the *Argonauta*) are of welded steel construction and are powered by Lorimer 6-cylinder Diesels. The engines operate at 600 rpm to provide 100 bpm, and also drive 2″ Fairbanks Morse bilge pumps.

The vessels are ice refrigerated and have 4″ of Fiberglass in bottoms, sides and on extreme forward and after ends of ice holds, and 6″ of Fiberglass under the deck.

The trawlers have a molded beam of 16′ and a molded depth of 7′4″. Shell plating is 3/16″ steel and engine room floors are of ¼″ steel plate. Other floors are 3/16″ plate. A 1″x6″ steel bar keel is provided.

Each of the welded steel trawlers have accommodations for a crew of six men, with four being housed in the main deck and two in the fore peak.

BRIEF SPECIFICATIONS

Length, Overall	48′—0″
Molded Beam	16′—0″
Molded Depth	7′—4″
Cruising Range	2,000 miles
Total Ice Capacity	18 tons
Fresh Water Capacity	400 gallons
Lubricating Oil Capacity	65 gallons
Fuel Oil Capacity	1,500 gallons

Crew's Quarters:
4 men in deck house and two men in fore peak.

Pumps:
1 - 2″ Fairbanks Morse bilge pump driven by main engine.

Insulation:
4″ of Fiberglass in bottoms, sides and on extreme forward and after ends of ice holds, and 6″ of Fiberglass under deck.

Main Engine:
Lorimer 6-cylinder Diesel, single acting, reverse gear, 4-stroke cycle, 6½x8½, 600 rpm, to provide 100 bhp. A flexible coupling connects the engine to the propeller shaft.

Electric Service:
32 volt battery system with one 250 watt generator on main engine and one 600 watt gasoline driven generator set.

Hull:
Shell plating is 3/16″ steel. Floors are constructed of ¼″ steel plate in the engine room. Other floors are 3/16″ plate. A 1″x6″ steel bar keel is provided.

Trawl Winch:
Blume Company 3 drum model 10 deck winch.

Propeller:
Doran Company 36″ diameter, designed especially for the Shrimp Trawlers by William Lambie.

On the Ways

New Construction — Reconditioning — Repairs

Dredge "New Orleans" Overhauled By Todd

The U. S. Army Engineers' dredge *New Orleans* is undergoing a thorough stem-to-stern overhaul at the Todd Hoboken shipyard which should virtually make it a new vessel. Built in 1911, the veteran dredge ship has been assigned for nearly its entire career to dredging the Delaware River along a 50-mile stretch out of Philadelphia.

The major step in rehabilitating the 315-foot vessel is the repowering of its two operating engines. The two old propulsion engines with their bearings, shafts, condensers, air pumps and other operating equipment have been removed from the ship and are being replaced by two (Skinner Unaflow Vertical) 3-cyl. steam engines, supplied by the Corps of Engineers. Also, new (Kingsbury) thrust bearings, (Allis Chalmers) condensers, (Dean Hill) turbine-driven circulating water pump, (Chicago Pump) vertical condensate pumps and new lubricating systems are being installed. At the same time, they are doing away with two 25 kw generators which are being replaced by a pair of 60 kw (Westinghouse) units.

Besides the engine-room refitting, the 30-foot, 85-ton, drag ladder, through which silt is sucked from the river bottom, is being cleaned, painted, getting new trunions, and having its defective steel plating renewed. The gates and bins in which the silt is stored until dumped elsewhere, are also being put in A-1 condition. There are to be two new propellers, with a 9′6″ pitch, together with new stern tubes; its anchor chains are being ranged, scraped and painted. Approximately 350 new rivets are being renewed, caulked or welded in the hoppers, and 250 feet of seam caulked or rewelded. The walls of the four boilers are being rebricked; the drag engine house completely rebuilt, and bathroom facilities for the officers and crew enlarged and modernized.

Finally, the vessel's hull is being wet sandblasted and completely repainted.

The New Orleans shown on drydock at the Todd Hoboken Shipyard.

Bethlehem Completes Conversion Of M.S. "Balla"

The Norwegian motorship *Balla* stood out for foreign shores recently after an extensive conversion, which included rebuilding of her stern from a twin to a single screw unit, by Bethlehem Steel Company's Staten Island Yard.

The conversion work, which necessitated installation of new main engines and auxiliaries, modification of two lower decks and a sweeping changeover in most of her machinery, took approximately nine weeks.

Built in 1923, the trim freighter has an overall length of 297 feet 7 inches, beam of 43 feet 9 inches, depth of 21 feet 5 inches and gross tonnage of 2,565.

Faced with the necessity for extensive repair of the 25-year-old vessel, her owner, Th. Brovig, decided after investigation that it would be more economical to convert the craft to a single screw unit than to renovate the original equipment, much of which had become obsolete.

Charles N. Boylan, manager of the Staten Island Yard, said that conversion of the motorship to a single screw basis will entail no loss in sea speed of the *Balla*. He revealed details of the conversion and disclosed that he had been informed that owners of the *Balla* had decided to have the work done in the United States because foreign yards generally demanded at least six months to do the job—almost three times that required by the Staten Island Yard.

Complete modification of the stern was necessary to convert the craft to the single screw unit, Mr. Boylan pointed out. The entire stern section below the water line was removed to a depth of approximately 25 feet inward from the original stern. A new cruiser-type stern was built to replace the twin-screw unit.

The changeover necessitated replacement of much of the original machinery and equipment. Installations, for instance, included a new Lima-Hamilton main motor of approximately 2,000 S.H.P., two new Atlas Imperial diesel generators with coolers and sumptanks, with 75 KW A.C. generators, three A.C. switchboards, a Hastis electric-hydraulic steering gear, new sterntube, sternframe, rudder, propeller, propeller shaft and intermediate shaft, a new lubricating oil tank, two lubricating oil coolers, a fresh water cooler, a seawater cooling pump and two fresh water cooling pumps.

In order to install the new main motor a 9'x12' opening was burned out in the forward engine room bulkhead. All pipe lines, grating ladders, etc., had to be disconnected and the old engines removed from the ship. The original main motor foundations were burned out and a new foundation plate 30'x8'x1⅛" put into place and then the new engine installed. A new auxiliary motor replaced the original unit.

Conversion of the original stern required the making and installation of new keel plates which were joined to the new stern frame.

In general, the vessel was brought up to tip-top shape. The entire hull was tested and repairs and replacements made. Extensive repairs and renewals were made to cargo handling gear, and the saloon, captain's office and quarters of the captain, chief mate and chief engineer were refurbished.

The overall job was the most extensive in the vessel's twenty-five years at sea and when she left the yard her crew members proclaimed her "as good as new."

Stern of the Norwegian freighter M. S. Balla already has been converted from a twin to single screw unit in this view, which shows installation of a new propeller.

Navy's Super Aircraft Carrier

The Navy has released an artist's conception of the 65,000 ton aircraft carrier scheduled to have its keel laid late this year or early in 1949 at the Newport News Shipbuilding and Dry Dock Corporation in Newport News, Virginia. This new vessel will cost an estimated $124,000,000.

The super carrier, as yet unnamed is designated as CVA-58. It is the result of normal development and planning for air-sea power.

Design studies on the new carrier have been under way since October 1945 and some 78 different designs were made before acceptance. The suggestion for a large flush-deck carrier came originally from the late Admiral Marc A. Mitscher, USN, whose brilliant record commanding task forces in the Pacific during the last war gave him a keen knowledge of carrier requirements.

The artist's drawing of the new 1030 foot long vessel depicts a totally clean deck operating area for its planes, minus the usual "island" on the starboard side. The flag and ship bridges, formerly on the island, will be telescopic on the new vessel.

The drawing of the new vessel shows the elevators, used to transfer planes between the hangar and flight decks, located along the sides with a larger elevator at the after part of the flight deck. The CVA-58 drawing also includes four catapults for planes, one on each side launching to the side and two on the bow. By so increasing the number of catapults, the launching interval will be shortened.

The new CVA-58 is one of several U. S. warships whose design does not allow passage through the Panama Canal. Her waterline beam will be 130 feet, with a maximum fixed width above the waterline of 190 feet.

The new design, calling for 65,000 tons, is a normal development in carrier history whereby each class has increased by about one-half the displacement of its predecessor.

The need for this increase is portrayed by the history of the *Saratoga.* When she was completed in 1927, jet propulsion and heavy fighting planes were unthought of, yet the *Sara* in her twenty years, saw twenty years of aviation development. Her first planes weighed less than 3,000 pounds with a combat radius of possibly 100 miles. When the ship was stricken from the Navy records after the Bikini A-bomb tests in 1947, she was able to handle planes with a fighting weight of more than 18,000

This is an artist's drawing of the U. S. Navy's 65,000 ton flush deck aircraft carrier. Though the basic design and major characteristics of the ship have been fixed, the location of certain structures, such as the stacks, elevators and the telescopic bridge, is still under study. This artist's conception reflects the Navy's present plans for the carrier When completed, the actual appearance of the ship may differ somewhat from this interpretation of the basic plans. The largest U. S. Naval vessel to be constructed so for, the flush deck carrier will measure 130 feet longer on the waterline than the 45,000 ton Midway class carriers. Her overall length will be 1,090 feet. Including temporary structures which may be hinged up or down, the maximum width of the carrier will be 236 feet. Speed will be about 33 knots.

pounds and a combat radius five times as great as her first air groups.

This factor of "six-times-as-large" for the size of its aircraft through the life of one carrier, indicates that the new CVA class should be capable of operating an airplane of well over 100,000 pounds, providing this growth in plane size continues. The operation of such aircraft with their increased range will greatly reduce the carrier's chance of discovery by the enemy and greatly increase the probability of surprise attack.

Foreseeing the operation of such an aircraft, the carrier from which it operates must afford:

(1) Deck strength for impacts as high as 500,000 pounds.

(2) Stability for high top side weights.

(3) Increased flight deck area.

(4) Room for increased supplies of fuel, munitions, and added personnel.

(5) Additional armor and armament.

(6) High speed.

These requirements mean increased displacement and increased beam with a proportional increase in deck length as dictated by modern shipbuilding practice.

The lengths of carriers have increased an average of about 100 feet for each new class in the development of these vessels. The *Yorktown* and *Enterprise* had a deck length of about 810 feet. The Essex class carriers are about 880 feet, while the last big carriers to be built, the CVE class, are about 980 feet. The new design, with its 1030 foot length (actual greatest length topside counting hull and flight deck is 1090 feet), is thus a normal increase as the new CVA becomes the longest warship in the world.

Evolution of U. S. Navy carriers shows progression to larger, heavier ships. This composite silhouette of the classes of U. S. Navy aircraft carriers shows the consistent progression to larger and heavier ships, in ratio to the increased size and weight of Naval carrier aircraft. The first carrier to be built as such from the keel up was the USS Ranger (CV-4). Built by the Newpot News Shipbuilding and Drydock Company, of Newport News, Virginia, the Ranger was commissioned on June 4, 1934. Previous carriers had been converted from other types. For instance, the Lexington class ships were built on battle cruiser hulls. The new CVA-58, 65,000-ton carrier, is to be built by the same shipyard which constructed the Ranger.

Bunting Company Completes Western Market Survey

M. A. Hamman, assistant sales manager of Bunting Brass & Bronze Company, Toledo, Ohio, manufacturers of electric motor bearings, industrial bearings, bronze bars and other bearing metals, has recently completed an extended market survey of Western potential to gather first-hand knowledge of rapidly expanding West Coast industries.

Facts and figures obtained from personal visits with leading industrialists, according to Hamman, indicate a growing need for closer cooperation and greater awareness of their material needs by Eastern manufacturers.

"The good-will of these men, which Bunting enjoys today," reports Hamman, "can be attributed in part to the fine job of customer relations which has been carried on by their Western distributor, Tri-State Supply Corporation, who maintain offices and warehouses in Los Angeles, San Francisco and Seattle."

M. A. Hamman, assistant sales manager, Bunting Brass & Bronze Co., Toledo, Ohio, compares notes with Tri-State officials, West Coast distributors for Bunting. From left to right: C. R. Grundy, Tri-State manager, San Francisco; M. A. Hamman; and G. M. Eickmeyer, Tri-State vice president, San Francisco.

NEWS FLASHES

WATERMAN CONVERSIONS

The Waterman Steamship Corporation has added eleven C-2 cargo vessels to its fleet, each to carry twelve passengers. One of these is undergoing conversion at their own yard. The other ten are on the Pacific Coast and will go into Pacific Coast yards. The average cost exceeds a half million dollars.

The YOUNG AMERICA and the GOLDEN CITY go to Everett Pacific.

The HOTSPUR and the JOHN LAND go to Todd, Seattle.

The TYPHOON goes to Todd, San Francisco.

The WAR HAWK goes to Todd for drydocking and the Puget Sound Bridge and Dredge for conversion.

The DASHING WAVE will go to either Todd, San Francisco, Triple AAA or Puget Sound Bridge and Dredge.

The WINGED ARROW will go to either Everett Pacific or Bethlehem, San Francisco.

The HERALD OF THE MORNING will go to either Everett Pacific or to Moore's.

The DELSANTOS announcement will come later.

All of thme above vessels were surveyed at General Engineering and Drydock, Alameda, at a total cost of about $600,000.

* * * * *

LUCKENBACH'S CONVERSIONS

Surveys have been completed and specifications are under preparation for seven C-3s for Luckenbach. All are on the Pacific Coast and bids will be called for when the Maritime Commission approves final specifications. Three of the surveys were made at General Engineering, two by Bethlehem, San Francisco, and two by Todd, Seattle.

Two of the vessels, the SEA STAR and the SEA BARB are at Seattle. Five others, SEA FLYER, SEA RUNNER, SEA BASS, SEA CAT and SEA DEVIL are in San Francisco Bay.

Six of the above were built at Western Pipe & Steel and one at Ingalls. Surveys were made by M. J. Ryan.

* * * * *

BIG TANKERS

In addition to the 26,000 and 28,000 ton tankers now under construction in Eastern yards, and the 30,000 ton tankers in the "National Defense" program, six vessels are in the works rated at 32,000 tons. Three are for Atlantic

Refining and three for Gulf Oil. Opening of bids on National Defense tankers extended to October 11.

* * * * *

FOURTEEN NEW FERRIES

The Washington Toll Bridge Authority is planning a fleet of new auto ferries for operation on Puget Sound. They are to be 300 ft. long and 66 ft. beam. Three are to be 100 car, 1200 passenger; two, 60 car, 500 passenger; nine, 60 car, 100 passenger. W. C. Nickum is the architect.

* * * * *

INTER-ISLAND AUTO VESSEL FOR HONOLULU

The Inter-Island Steam Navigation Company, Honolulu, is planning an auto and passenger vessel similar to the $2,000,000 "Chinook" of the Puget Sound Navigation Company. The Chinook is 318 ft. long and carries 100 cars and 900 passengers.

* * * * *

AMERICAN BUREAU FIGURES IN P.M.R.

Approval has been granted by the American Bureau of Shipping for the publication of the Bureau's monthly report on ship construction. It will be found immediately following "Flashes".

* * * * *

BETHLEHEM STEEL GRANTS FUNDS FOR ATOM STUDY

The University of Chicago has announced that the Bethlehem Steel Company had invested $100,000 in the university multi-million dollar program of atomic and metal research. Bethlehem is the thirteenth industrial organization to support the research program sponsored by the university's Institute of Metals, Institute of Nuclear Studies and Institute of Radiobiology and Biophysics.

* * * * *

MARINE OFFICE OF AMERICA IN NEW QUARTERS

The Marine insurance firm, Marine Office of America, and its affiliate, S. D. McComb & Co., have moved to beautiful new offices at 140 Sansome St., San Francisco. Fred Galbreath is manager.

* * * * *

GENERAL STEAMSHIP CORP. BUYS BUILDING

The building at 432 California St., San Francisco, has been purchased by General Steamship Corp. and will be occupied in about six months. The company's Los Angeles offices will be moved to the new General Petroleum building at 724 West Sixth St. when that building is completed.

* * * * *

JAPAN MERCHANT FLEET BEING SALVAGED

A good portion of the Japanese merchant marine which was sunk by American

planes and submarines during the war is being brought to the surface by extensive salvage operations, according to a statement by the Japanese Maritime Safety Board.

Since 1946, when operations began, Japanese divers have raised 980 vessels totaling 317,000 tons. Most of these are small ships but 76 large vessels have been salvaged and are already in operation, carrying freight and passengers. The Maritime Board estimates that about one-sixth of the war losses have been replaced by salvage.

* * * * *

MODERNIZING TUGBOAT FLEET

A program for modernizing and rehabilitating its tugboat fleet, including acquisition of a new vessel, was announced by the Socony-Vacuum Oil Company, Inc.

A net effect of the program, according to Frederic R. Pratt, manager of the company's Maritime Transportation Department, will be an increase in the fleet's total horsepower, with no vessel having less than 900 horsepower.

Two vessels in the Soconoy-Vacuum tug fleet will be converted from steam to diesel with 1000-horsepower at the shaft, compared with 600 horsepower steam engines with which the tugs are now equipped. The conversion will be started about January 1.

* * * * *

$250,000 TUNA CLIPPER

From Alex Robinson of Long Beach Marine Repair Co., Long Beach, Cal., we learn that work is progressing on 105' all brine tuna clipper; 25' beam; 12' depth; 170 tons. Engine is to be 600 horsepower diesel.

* * * * *

STANDARD ACQUIRES NEW JERSEY OIL REFINERY PLANT

Standard Oil Co. of California has exercised its option to purchase the minority interest in California Refining Co. held by the Barber Oil Corp.

California Refining operates a refinery at Perth Amboy, New Jersey, and will now become a wholly-owned subsidiary of Standard Oil Co. of California.

* * * * *

ARMY ENGINEERS DREDGE TO BE REPOWERED

Bids will be received until November 2 by the Corps of Engineers, 74 New Montgomery St., San Francisco, for the repowering, altering and general repairing of the U. S. Seagoing Hopper Dredge, A. MACKENZIE. The dredge is now at Sausalito on San Francisco Bay.

* * * * *

The railroads' "navy" comprises nearly 2,000 units, consisting of car ferries, tug boats, car floats, barges and lighters, and other marine equipment, largely used in harbor and ferry operations.

Vessels Under Construction

And or Under Contract September 1st, 1948

BUILDING TO AMERICAN BUREAU OF SHIPPING CLASSIFICATION

Builder	*Hull No.*	*Type Size Name*	*Power*	*Owner*	*No. of Vessels*	*Est. ** Gr. Tons D.W. Tons*
SEAGOING						
Bethlehem-Sparrows Pt. Shpyd., Sparrows Pt., Md.	4463 to 4465	Oil Tanker 524'x68'x37'6' "Olympic Games"—Hull 4463 Keel Laid 4-5-48—Launched 8-27-48 "Atlantic Prince"—Hull 4464—Keel Laid 5-10-48 Hull 4465—Keel Laid 6-14-48	Turbine 6050 H.P.	Foreign Interests	(3)	10,750 ea. 18,000 ea.
do	4466	Oil Tanker 524'x68'x37'6" Keel Laid 7-26-48	Turbine 7700 H.P.	Foreign Interests	(1)	10,750 18,000
do	4467 4468	Oil Tanker 595'x84'x44 Hull 4467—Keel Laid 7-19-48	Turbine 13,750 H.P.	Gulf Interests New York, N. Y.	(2)	16,750 ea. 28,000 ea.
do	4469	Oil Tanker 595'x84'x44'	Turbine 13,750 H.P.	Foreign Interests	(1)	16,750 28,000
do	4470 4471	Oil Tanker 595'x84x44	Turbine 13,750 H.P.	Gulf Interests New York, N. Y.	(2)	16,750 ea. 28,000 ea.
do	4472 to 4475	Oil Tanker 595'x84'x44'	Turbine 13,750 H.P.	Olympic Oil Lines, Panama, S. A.	(4)	16,750 ea. 28,000 ea.
do	4476 to 4479	Oil Tanker 487'6"x68'x37'	Turbine 7,700 H.P.	A-C Tankers, Inc. New York, N. Y.	(4)	9,900 ea. 16,500 ea.
do	4480 to 4484	Oil Tanker 595'x84'x44	Turbine 13,750 H.P.	Foreign Tankship Corp. San Francisco, Cal.	(5)	16,750 ea. 28,000 ea.
Bethelehem Steel Co. Shipbuilding Division Quincy, Mass.	1607 to 1610	Oil Tanker 595'x84'x44' Hull 1607—Keel Laid 8-2-48 Hull 1608—Keel Laid 9-1-48	Turbine 13,750 H.P.	The Texas Co. New York, N. Y.	(4)	16,750 ea. 28,000 ea.
do	1611	Oil Tanker 595'x84'x44'	Turbine 13,750 H.P.	Foreign Interests	(1)	16,750 28,000
do	1618-1619	Passenger & Cargo 632'x89'x53' P3-S2-DL2 972 Passengers	Turbine 55,000 H.P. Twin Screw	American Export Lines New York, N. Y.	(2)	20,500 ea. 12,000 ea.
Canadian Vickers, Limited Montreal, Canada	224	Cargo Vessel 424'x59'x29'2" "Loide—Uruguai"—Keel Laid 3-1-47—Launched 7-7-48	Turbine 6600 H.P.	Lloyd Brasileiro Rio de Janeiro, Brazil	(1)	5388 7850
Gulfport S.B. & D.D. Corp. Port Arthur, Texas	341	Hopper Dredge 221'x44'x21' "Mariano Ospina Perez" Keel Laid 4-2-48	Unaflow 3,260 H.P. Twin Screw	Republic of Colombia	(1)	1,880
Harima Dockyard Oh, Harima, Japan	443	Cargo Vessel 377'4"x53'6"x29'6" "KB 1"	Turbine 2300 H.P.	Sanko S.S. Co., Ltd. Osaka, Japan	(1)	4,950 6,500
Ingalls Shipbuilding Corp. Pascagoula, Miss.	516	Cargo Vessel 424'x59'x29'2" "Loide-Equador"—Keel Laid 7-7-47—Launched 1-8-48	Turbine 6600 H.P.	Lloyd Brasileiro Rio de Janeiro, Brazil	(1)	5408 7870
do	520-521	Cargo Vessel 215'5"x42'6"x15'6" "M.O.P. 943" (520)—Keel Laid 1-19-48—Launched 5-7-48 "M.O.P. 944" (521)—Keel Laid 1-21-48—Launched 5-21-48	Diesel 700 H.P. Twin Screw	Ministry of Public Works Argentine Republic	(2)	1123 ea. 1134 ea.
Ingalls Shipbuilding Corp. Pascagoula, Miss.	526	Oil Tanker 385'x62'6"x21'	Unaflow 2800 H.P. Twin Screw	The Texas Co. New York, N. Y.	(1)	4,300 7,800
Kawasaki Heavy Industry Co., Ltd., Kobe, Japan	848	Cargo Vessel 367'x52'6"x29'6" "KB 3"	Turbine 2400 H.P.	The United Ocean Transport Co., Ltd. (Daido Kaiun Kabushiki Kaisha)	(1)	4,550 6,500
Mitsubishi Nagasaki Dockyard, Nagasaki, Japan	—	Cargo Vessel 374'x53'11½"x29'6" "Pacific Maru"	Turbine 2400 H.P.	The First Shipping Co., Ltd., Kobe, Japan	(1)	4,825 6,500
Newport News S.B. & D.D. Co., Newport News, Va.	475-478	Oil Tanker 600'x82'6"x42'6" Hull 475—Keel Laid 7-7-48	Turbine 13,750 H.P.	Standard Oil Co., (N.J.) New York, N. Y.	(4)	16,750 ea. 26,000 ea.
do	479	Oil Tanker 600'x82'6"x42'6"	Turbine 13,750 H.P.	N. G. Livanos New York, N. Y.	(1)	16,750 26,000
do	480 to 485	Oil Tanker 600'x82'6"x42'6"	Turbine 13,750 H.P.	Standard Oil Co., (N.J.) New York, N. Y.	(6)	16,750 ea. 26,000 ea.
New York Shipbuilding Corp. Camden, N. J.	482 to 484	Oil Tanker 625'x85'x45'	Turbine 18,000 H.P.	—	(3)	19,540 ea. 32,000 ea.
do	485 to 487	Passenger & Cargo 500'x73'x49' P2-S1-DN1 228 Passengers	Turbine 13,750 H.P.	American President Lines San Francisco, Cal.	(3)	12,660 ea. 10,600 ea.

[illegible]n S.B. & D.D. Co., Chester, Pa.	566	Oil Tanker 600'x82'6"x42'6" Hull 566—Keel Laid 5-1-48	Turbine 13,750 H.P.	Standard Oil Co., (N.J.) New York, N. Y.	(2)	16,750 ea 26,000 ea
do	567 569	Oil Tanker 600'x82'6"x42'6" Hull 567—Keel Laid 7-8-48	Turbine 13,750 H.P.	Gulf Oil Corp., New York, N. Y.	(2)	16,750 ea 26,000 ea
Sun S.B. & D.D. Co., Chester, Pa.	570 to 576	Oil Tanker 600'x82'6"x42'6"	Turbine 13,750 H.P.	Tankers Navigation Co., New York, N. Y.	(7)	16,750 ea 26,000 ea
do	577- 578	Oil Tanker 600'x82'6"x42'6"	Turbine 13,750 H.P.	Standard Oil Co., (N.J.) New York, N. Y.	(2)	16,750 ea 26,000 ea
Welding Shipyards, Inc. Norfolk, Va.	24- 25	Oil Tanker 615'x84'x43'9" Hull 24—Keel Laid 5-1-48	Turbine 17,500 H.P.	Oceanic Tankships, S. A., New York, N. Y.	(2)	17,940 ea 30,000 ea
				TOTAL	70	1,009,877 G.T.

GREAT LAKES

American Ship Building Co. Lorain, Ohio	866	Bulk Ore Carrier 660'x70'x37' "Wilfred Sykes"	Turbine 7,700 H.P.	Inland Steel Co. Chicago, Ill.	(1)	11,800 21,150

MISCELLANEOUS—STEEL

* Avondale Marine Ways Westwego, La.	275	Oil Barge 110'x30'x7	none	Humble Oil & Refining Co. Houston, Texas	(1)	175
* do	276 277	Deck Cargo Barge 110'x30'x7	none	Humble Oil & Refining Co. Houston, Texas	(2)	175 ea.
* do	278	Covered Cargo Barge 110'x30'x7	none	Humble Oil & Refining Co. Houston, Texas	(1)	225
Bethlehem Steel Co. Shipbuilding Division Staten Island, N. Y.	8121- 8122	Coal Hopper Barge 146'x38'x17'6" Hull 8121—Keel Laid 7-26-48—Launched 9-8-48 Hull 8122—Keel Laid 7-27-48—Launched 9-8-48	none	M. & J. Tracy, Inc. New York, N. Y.	(2)	885 ea.
do	8125- 8126	Coal Hopper Barge 146'x38'x17'6"	none	Berwind White Coal Mining Co., New York, N. Y.	(2)	885 ea.
do	8127 to 8132	Coal Hopper Barge 146'x38'x17'6"	none	M. & J. Tracy, Inc. New York, N. Y.	(2)	885 ea.
Bethlehem Steel Co., Shipbuilding Division, Staten Island, N. Y.	8133	Oil Barge 230'x43'x14'6" "Morania No. 140" Keel Laid 8-26-48	none	Morania Oil Co. New York, N. Y.	(1)	1278
* do	8134	Oil Barge 230'x43'x14'6"	none	Gulf Oil Corp. New York, N. Y.	(1)	1,278
Bethlehem Steel Co., Shipbuilding Division, Beaumont, Texas	6508	Oil Barge Integrated Tow 290'x50'x10'6" Keel Laid 7-26-48	none	American Barge Line Co. Jeffersonville, Ind.	(1)	1140
do	6512 to 6517	Ore Barge 267'x52'x18'6"	none	Ore Steamship Corp. New York, N. Y.	(6)	1925 ea.
do	6526	Oil Barge Integrated Tow 290'x50'x10'3"	none	Berwick Bay Towing Co., Inc. New Orleans, La.	(1)	1,115
Calumet Shipyard & D.D. Co. Chicago, Ill.	197	Towboat 103'x26'x9' Keel Laid 4-29-48	Diesel 850 H.P.	Central Barge Co. Chicago, Ill.	(1)	215
do	198	Towboat 142'x34'x9'10" Keel Laid 7-1-48	Diesel 2592 H.P. Twin Screw	Central Barge Co. Chicago, Ill.	(1)	440
Defoe, Inc. Shipbuilding Division Bay City, Mich.	420	Fire Boat 93'x23'x9'2" Twin Screw	Diesel 750 H.P.	City of Milwaukee Milwaukee, Wisc.	(1)	180
Dravo Corporation Neville Island, Pittsburgh, Pa.	2749 to 2758	Coal Hopper Barge 175'x26'x10'8"	none	Stock	(10)	365 ea.
do	2806 to 2810	Hydrochloric Acid Tank Barge 195'x35'x11'	none	The Dow Chemical Co. Houston Teas	(5)	560 ea.
Dravo Corporation Neville Island, Pittsburgh, Pa.	2812 to 2822	Articulated Oil Barge 195'x35'x10'10"	none	Ashland Oil & Refining Co., Ashland, Ky.	(11)	615 ea.
do	2827 to 2836	Oil Barge 178'x38'x14' Erection at Wilmington, Del., Yard	none	Standard Oil Co. (N.J.) New York, N. Y.	(10)	710 ea.
do	2837 to 2841	Oil Barge 242'x38'x14' Erection at Wilmington, Del., Yard	none	Standard Oil Co. (N.J.) New York, N. Y.	(5)	960 ea.
do	2842 to 2849	Deck Cargo Barge 100'x26'x7'3"	none	Thomas Jordan, Inc. New Orleans, La.	(8)	149 ea.
* Equitable Equipment Co. Madisonville, La.	455 to 458 462 to 466 501	Tug 41'11"x12'5¼"x6'10" Hull 455—Keel Laid 10-31-47—Launched 4-14-48 Hull 456—Keel Laid 11-4-47 Hull 457—Keel Laid 11-7-47 Hull 458—Keel Laid 12-17-47 Hull 462—Keel Laid 12-29-47 Hull 463—Keel Laid 4-6-48 Hull 464—Keel Laid 5-5-48 Hull 465—Keel Laid 5-19-48 Hull 466—Keel Laid 5-19-48	Diesel 200 H.P.	Stock	(10)	25 ea.

Gulfport S.B. & D.D. Corp. Port Arthur, Texas	335	Tug 96'x24'x12'6" Keel Laid 3-4-48 Launched 8-21-48	Geared Diesel 1200 H.P.	General Motors Corp., Cleveland Diesel Eng. Div., Cleveland, Ohio	(1)	186
Hillman Barge & Construction Co. Alicia, Pa.	504	Towboat 145'x28'x9' Keel Laid 2-20-48	Diesel 1000 H.P. Twin Screw	Hillman Transportation Co., Pittsburgh, Pa.	(1)	439
Hillman Barge & Construction Co., Alicia, Pa.	505	Towboat 145'x28'x9' Keel Laid 6-16-48	Diesel 1400 H.P. Twin Screw	Hillman Transportation Co., Pittsburgh, Pa.	(1)	439
do	506-507	Towboat 115'x27'x8'6"	Diesel 800 H.P. Twin Screw	Hillman Transportation Co., Pittsburgh, Pa.	(2)	250 ea.
Ingalls Shipbuilding Corp. Decatur, Ala.	695 696	Oil Barge Integrated Tow 240'45'x10'3"	none	Industrial & Marine Service Co. Memphis, Tenn.	(2)	825 ea.
do	701 to 706	Tank Barge 195'x35'x9'9" Hull 701—Keel Laid 7-23-48 Hull 702—Keel Laid 8-2-48 Hull 703—Keel Laid 8-11-48 Hull 704—Keel Laid 8-19-48 Hull 705—Keel Laid 8-31-48	none	Carbide & Carbon Chemicals Corp.	(6)	500 ea.
do	707 708	Oil Barge 180'x35'x10'	none	Berard Brothers New Iberia, La.	(2)	470 ea.
do	717	Oil Barge 175'x40'x11'	none	Diesel Corporation Jacksonville, Fla.	(1)	580
do	718	Oil Barge 175'x40'x11'	none	Florida Fresh Water Corp., Jacksonville, Fla.	(1)	580
do	719-720	Oil Barge 254'x50'x11'	none	Standard Oil Co. of Ky. Louisville, Ky.	(2)	1005 ea.
do	721 to 724	Cargo Barge 195'x35'x11'	none	Marquette Cement Mfg. Co., Chicago, Ill.	(4)	600 ea.
Jakobson Shipyard, Oyster Bay, N. Y.	324	Tug 95'x24'x12'9"	Diesel-Electric 1,000 H.P.	Erie Railroad Co., New York, N. Y.	(1)	235
Jeffersonville B. & M. Co., Jeffersonville, Ind.	239	Towboat 120'x34'6"x11'	Diesel 2400 H.P.	Jeffersonville B. & M. Co. Jeffersonville, Ind.	(1)	420
do	249	Towboat 115'x30'x10'3"	Diesel 2220 H.P.	Illinois Farm Supply Co. Kingston Mines, Ill.	(1)	325
Levingston Shipbuilding Co. Orange, Texas	428	Scow Barge 110'x30'x6'10"	none	Humble Oil & Refining Co. Houston, Texas	(1)	170
do	441 to 445	Harbor Tug 100'9"x27'x14'6"	Diesel-Electric 1500 H.P.	Moran Towing & Transportation Co., New York, N. Y.	(5)	340 ea.
do	448	Oil Barge 110'x30'x7'3" 3000 Bbls.	none	Levingston Shipbuilding Co., Orange, Texas	(1)	180
do	449	Oil Barge 136'x34'x8'2" 5000 Bbls.	none	Levingston Shipbuilding Co., Orange, Texas	(1)	282
Luders Marine Construction Co., Stamford, Conn.	900	Pass. & Auto Ferry 58'x30'x8'2" "Selden III"	Diesel 160 H.P.	State of Connecticut	(1)	115
John H. Mathis Co. Camden, N. J.	173	Trawler 99'2"x23'x13'2" Keel Laid 6-12-46	Diesel 575 H.P. Machinery Aft	Stock	(1)	264
do	180-181	Ferry Boat 165'x45'x15'6" Hull 180—Keel Laid 8-4-48	Diesel-Electric 1160 H.P.	Norfolk County Ferries Norfolk, Va.	(2)	1290 ea.
Maxon Construction Co. Marine Division Tell City, Ind.	135	Oil Barge 195'x35'x9'9"	none	Maxon Construction Co. Dayton, Ohio	(1)	500
Newport Ships Newport, Fla.		Yacht 98'x22'6"x10'3" "Sea Pine II"	Diesel 600 H.P. Twin Screw	Newport Ships, E. P. Larsh, Newport, Fla.	(1)	150
Pacific Coast Engineering Co., Alameda, Cal.	140	Harbor Tug 70'3"x18'8"x11'x3"	Diesel 475 H.P.	Board of State Harbor Commissioners, San Francisco, Cal.	(1)	100
Platzer Boat Works Houston, Texas	152-153	Tug 87'11"x23'x11'1"	Diesel 900 H.P.	Port Houston Iron Works, Houston, Teas	(2)	165 ea.
RTC Shipbuilding Corp., Camden, N. J.	185	Fireboat 73'4"x18'x8'8" Keel Laid 6-14-48	Diesel 660 H.P.	City of Philadelphia	(1)	95

NOTES:

*Added to list during month of August:
34 Vessels—144,593 Gross Tons.

Deleted from list during month of August due to completions and cancellation:
23 Vessels—16,783 Gross Tons.

*Tonnages subject to revision in individual cases owing to differences in exempted spaces.

Application for classification of Hull 6522 now being constructed by Bethlehem Steel Co., Shipbuilding Division, Beaumont, Teas, previously listed in The Bulletin, has been cancelled and the item deleted.

(Please turn to page 80)

Running Lights

Propeller Club Golf Tourney

Snapped at the Propeller Club Outing were, left to right: John Battini, Pro at Lakeside Country Club; Hughes Ogilvie, General Electric Company; Paul Faulkner, hoss shoe'r; Art Forster, yodeler; Emmet Ahern, Irish tenor; George Crow, electrical wizard; George Swett with pipe and fittings attached.

Bob Lillivand, Al Pittman and Bob Spear.

Divot diggers, horseshoe hurlers, lockerroom laddies and benign banqueters were shipmates aboard the sixth annual Propeller Club golf tourney and dinner at Olympic Country Club, September 3.

The big day honored Hugh Gallagher, who laden with many tokens of esteem from his Propeller mates moves across to Washington, D. C., this month, for new duties for Matson.

Chairman of the event was Les White of Matson's Engineering division. He proved a good helmsman and can rightfully put the tag on this one as the biggest and best! Some 220 members and their guests enjoyed the many features. Al Gatov, head of the Pacific American Steamship Association, relaxing from the arduous duties which attend his important responsibility, was official toastmaster of the evening and presented the club's beautiful tribute to the honored Hugh.

George Killion, A.P.L. top executive, was introduced, and officiated at the awarding of the top prize of the day for the winner of the Brass Hat flight earned with a clean 66 by none other than Hugh Gallagher himself!

Other big time golf winners were Frank McGuigan, scoring low net for members, and Bill Brigham, low gross.

Guiding spark-plug of the prize committee was D. N. "Bob" Lillevand, V. P. of Grace Line, aided, and lustily, by Bern DeRochie of *Pacific Marine Review*, and his gentlemanly aides. Honest George Swett proved a swell choice as handicap mentor. Carl McDowell, assistant Secretary, survived throughout a hotly contested horseshoe-pitching battle and finally shook off such contenders as Carroll Reeves, the sub-chairman of this event, and Brownie Atherton of Tubbs Cordage, a formidable foe when teamed with Ken Atwater of Columbian. Such goings on!

PMR compliments Les for the success of the complete voyage. Quoting Gene Hoffman at the following luncheon meeting on September 15, "Never have so few chiseled so many milestones."

THE HORSESHOE TOURNAMENT—A SYMPHONY OF MOTION

Lillivand Ingersoll McDowell DeRochie Reeves Atwater Manuel Osgood

To left: J H Jensen, Matson, J B. Hurd, Alexander & Baldwin K C Tripp, Moo e-McCormack, E J Bradley Matson **Top right:** Dick Hughes of Tubbs Cordage haling Lloyd Fleming a line. **Center left:** Low net winner McGuigan selects first prize from gift table. Committeeman John Johnson approves **Center:** Serious tribute wa paid to Hugh Gallagher by Al Gatov, who presented gift from club **Center right:** Hugh Gallagher is given a rising ovation as he receives his Brass Hat trophy fro George Killion. The hands think it was o k **Bottom:** Committeemen Bern DeRochie Carrol Reeves and George Swett awarding prizes.

: uest of honor Hugh Gallagher wonders what Les White has t for him—turned out to be the traditional clock thermometer in on, going-away present from the Propeller Club. Bill en ompletes the trio

v, eft to right: Charlie Cox, Nordberg, Gene Rhea, West Ejine, N. J. La Lanne, Winslow Engineering George Lienhard, be.

Enjoying the Propeller Club dinner, left to right: George Thierbach, Jones-Thierbach Co.; Vernon Showell, Bird-Archer; Captain Owe Dahlgren, Johnson Line; Fred Doelker, Johnson Line; Vincent McMurdo, Luckenbach; Barney White, Bird-Archer; Al Nolan, Redwood Export Co.

Chubb & Son Open Pacific Department

Chubb & Son, one of the country's leading insurance underwriting firms, on September 30 opened a Pacific Department with offices at 320 California Street, San Francisco, and 629 South Spring Street, Los Angeles, covering the 10 western states, Hawaii and Alaska.

They are managers of Federal Insurance Company, Vigilant Insurance Company, Sea Insurance Company, Marine Insurance Company, Ltd., Cathay Insurance Company and United States Guarantee Company. Combined admitted assets of the six companies, as of December 1947, total $95,225,343, with surplus to policy holders of $50,046,389.

Robert E. Wallace, vice president of the Federal Insurance Company and Vigilant Insurance Company, will supervise the Pacific Department with headquarters at San Francisco. Edward S. Reed will head the Los Angeles office. George Meredith, resident vice president of U. S. Guarantee Company, will be in charge of bonding.

Other key posts are: Cecil O. West, fire and automobile; Arnold G. Ure, casualty; Herbert L. Hodgetts, ocean and inland marine; Roy Little, surety; James S. McLean, casualty claims; James R. Miller, other claims.

The company's activities cover fire, automobile, casualty, surety, inland marine and marine policies. They are reported to be one of the world's largest underwriters of ocean cargo.

Left: Percy Chubb, 2nd, out from New York for the opening of new offices of Chubb & Son, Underwriters.

Right: Robert E. Wallace, manager of San Francisco office.

Low Temperature Air Conditioning For Perishable Cargoes on Ships

(Continued from September issue)

By JOHN F. KOOISTRA

EITHER an apparatus dewpoint chart or convenient tables (fig. 4) are available for establishing apparatus dewpoint temperatures.

FIGURE 4

D.B.	R.H.	D.P.	S.H.F.	APP. D.P.
50	95	48.5	.70	48
			.60	47
			.55	46
.50	90	47.2	.90	47
			.70	46
			.65	45
50	85	45.2	.90	45
			.80	44
			.75	43
40	95	38.9	.75	38
			.65	35
			.60	32
40	90	37.5	.90	37
			.70	34
			.65	31
40	85	36.0	.87	35
			.80	34
			.70	31
30	95	28.9	.70	28
			.65	26
30	90	27.7	.79	27
			.70	25
			.66	22
30	85	26.5	.86	26
			.75	24
			.70	20
20	95	19.0	.79	18
			.75	17
			.74	16
20	90	18.0	.95	18
			.84	17
			.78	15
20	85	16.8	.98	17
			.89	16
			.82	14

Coil Bypass

The cooling of air to the apparatus dewpoint can be accomplished only by means of an efficient spray type cooler. Dry coils such as normally used for refrigeration applications, either prime surface or finned type, do not completely cool the air to its dewpoint, in view of the

(*Please turn to page 87*)

Typical Cold Diffuser

Ice machine flat on one of the Matson reefer ships.

Seattle Propeller Club Elects

Gilbert J. Ackerman, operating manager of the American Mail Line, was elected president of the Propeller Club of the Port of Seattle in October. Claude E. Wakefield becomes vice president, while E. J. Barrington, Pope & Talbot, Inc., and Paul Pearson, Foss Launch & Tug Company, were named to the board of governors.

Captain W. D. Hill, who retired as marine inspection officer of the Coast Guard after nearly sixty years in maritime activities, was presenred a barometer by R. J. Lamont, vice president of the Todd Shipyards Corporation, on behalf of rhe club.

Vessels Under Construction Building to American Bureau of Shipping Classification

(Continued from page 75)

St. Louis S. B. & Steel Co. St. Louis, Mo.	—	Oil Barge 195'x35'x9'6"	none		(4)	485 ea.
do	—	Coal Hopper Barge 195'x35'x11'	none		(20)	560 ea.
do	—	Oil Barge 240'x45'x10'3"	none	St. Louis S. B. & Steel Co. St. Louis, Mo.	(4)	904 ea.
do	1005 1006	Towboat—Single Screw 105'x28'x10' "Davy Crockett"—Hull 1005 Keel Laid 2-20-48 "Sam Houston"—Hull 1006 Keel Laid 5-25-48	Diesel 1700 H.P.	Butcher-Arthur, Inc. Houston, Texas	(2)	285 ea.
do	1007 to 1010	Oil Barge 225'x38'x10'3" To be constructed at Paducah Marine Ways Division, Paducah, Ky. Hull 1007—Keel Laid 7-14-48	none	Illinois Farm Supply Co. Chicago, Illinois	(4)	660 ea.
Superior Marine Manufacturing Company South Kearny, N. J.	6	Tug 69'2"x20'x9'11½" "Itapiru" Keel Laid 12-8-46 Launched 3-10-48	Diesel 600 H.P.	Superior Marine Manufacturing Co., South Kearny, N. J.	(1)	95
do	7	Cargo Vessel 200'x38'x14'6" Keel Laid 12-15-47	Diesel 800 H.P. Twin Screw	do	(1)	915
United Shipbuilding Corp. East Boston, Mass.	100	Trawler 83'3"x21'6"x10'9" Keel Laid 6-1-47	Diesel 550 H.P.	Deep Sea Trawling Corp., Boston, Mass.	(1)	130
U. S. Shipbuilding Corp. Yonkers, N. Y.	40 to 43	Trawler 97'x24'3"x13'	Diesel 500 H.P.	U. S. Shipbuilding Corp. Yonkers, N. Y.	(4)	235 ea.
				TOTAL	171	95,569

MISCELLANEOUS—WOOD

Wharton Shipyard Jamestown, R. I.	—	Passenger Ferry 63'x18'x7'6" "Point O'Woods IV" Keel Laid 1-29-48 Launched 8-21-48	Diesel 420 H.P. Twin Screw	Point O'Woods Association, Point O'Woods, N. Y.	(1)	60

SUMMARY

SEAGOING	—	70 Vessels	1,099,877 Gross Tons
GREAT LAKES	—	1 "	11,800 " "
MISCELLANEOUS—STEEL	—	171 "	95,569 " "
MISCELLANEOUS—WOOD	—	1 "	60 " "
TOTAL		243 Vessels	1,117,306 Gross Tons

NOTE: There were building to American Bureau of Shipping Classification: August 1st, 1948 — 232 vessels — 990,006 gross tons.

OTHER VESSELS UNDER CONSTRUCTION IN UNITED STATES SHIPYARDS (OVER 1,000 GROSS TONS)

Bethlehem Steel Co. Shipbuilding Division Quincy, Mass.	1613 to 1617	Oil Tanker 595'x84'x44'	Turbine 13,750 H.P.	Atlas Tankers, Inc. New York, N. Y.	(5)	16,750 G.T. ea. 28,000 D.W.T.ea.
Eureka Shipbuilding Co. Newburgh, N. Y.	T1 T2 T3	Trawler 210'6¼"x36'2½"x 18'8½" Hull T1—Keel Laid 9-25-47 Hull T2—Keel Laid 9-30-47	Diesel 1000 H.P.	Portuguese Interests	(3)	1850 G.T. ea. 750 D.W.T.ea.
Sun S.B. & D.D. Co. Chester, Pa.	565	Hopper Dredge 500'x72'x40'5" Keel Laid 12-15-47 "Essayons"	Turbo-Electro 8000 H.P. Twin Screw	Corps of Engineers Washington, D. C.	(1)	10,700 G.T.
				TOTAL	9	100,000 G.T.

Operating Procedures On Electric-Drive Vessels

(Continued from page 49)

motor accelerates very rapidly. The inrush current to the motor causes the line ammeter to go off scale, about 2½ times normal. As the motor approaches its slip speed the ammeter drops back to about 150 per cent or normal and pulsates. At this point the reversing and field lever is moved to the number three run position (Figure 4) and on the ships with the two lever system the field lever is moved to the number two position.

This closes the motor field contactors applying direct current to motor field causing it to "pull into step" with the generated alternating current. The generator field remains over-excited for about five seconds to give the motor a high "pull in" torque and insure its coming into step with the generator. On the tankers the excitation drops back to normal automatically after the five-second delay. On the P2 vessels the field lever is moved from position two to the run position, after a few seconds delay, restoring the generator excitation to normal.

The operator is then free to advance the speed lever until the desired propeller speed is obtained.

To stop the equipment the operations are reversed. The operator first moves the speed lever to its idling position. The reversing and field lever is then returned to the "off" position. On ships equipped with the three-lever system, the field lever is moved to the "off" position before the reverser lever is returned to its off position.

In reversing, the sequence is the same as for ahead operation. The only difference electrically is that two of the three motor leads are interchanged. This changes the phase rotation of the power to the motor causing it to rotate in the astern direction. Figure 5 shows schematically how interchanging of the two phases is accomplished.

The time lag in moving the reversing and field lever from position two to position three is longer when making reversals with way on the ship than when starting the propeller with the ship at rest. The reason for this is that the ship in its movement tends to keep the propeller turning. The power that is exerted on the motor must first slow the propeller down. Several seconds elapse before the motor can bring the propeller to its stop position and then accelerate it in the reverse direction. Care must be taken, however, not to allow the lever to remain in position two after the motor has reached its maximum speed as an induction motor. This causes unnecessary heating of the generator field windings.

Looking back on the foregoing operations it should be noted that the main power contactors are opened or closed only when the field circuits to the motor and generator are open. Current is produced in the armature circuit only when the generator field is energized. Thus by arranging the sequence of contactor operation as shown, opening and closing of the main line contactors is accomplished only when the circuit is de-energized.

The speed lever is interlocked with the reversing and field lever so that the speed lever must be returned to its idling or maneuvering position before the reversing and field lever can be moved. This prevents the operation as an induction motor except at the idling speed of the generator.

Excitation Control

It is necessary at all times for the propulsion system to have sufficient torque between the generator and motor to prevent them from pulling apart. This is accomplished on the T2 tankers by automatic control of

(Please turn to page 92)

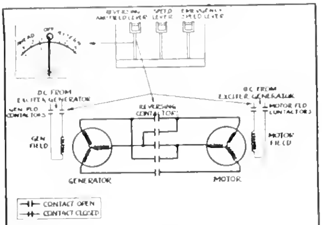


FIG 1 - REVERSER LEVER IN "OFF" POSITION

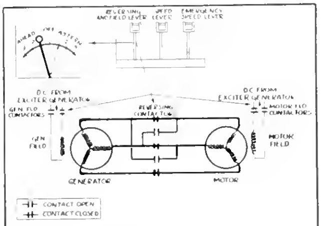


FIG 2 - REVERSER LEVER IN POSITION "ONE" AHEAD

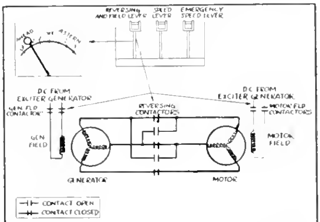


FIG 3 REVERSER LEVER IN POSITION "TWO" AHEAD

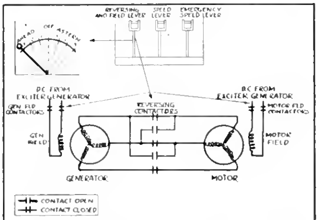


FIG 4 REVERSER LEVER IN POSITION THREE AHEAD

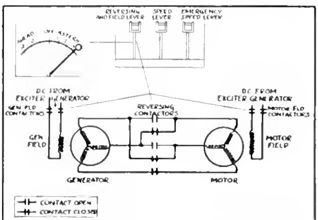


FIG 5 REVERSER LEVER IN POSITION "THREE" ASTERN

Gate and Globe Valves

(Continued from page 53)

across the lugs and pull up with a wrench. Be sure to coat the threads with a good lubricant before inserting the ring into the body. Lap in with a small emery block the same as when repairing a ring as shown in Illustration #6 for perfect fit to the disc.

Globe and Angle Valves

Repairs on globe and angle valves frequently can be made without removing them from the line. However, it is desirable when any repairs are needed to remove the valve from the line for thorough inspection and cleaning. To illustrate the general procedure for regrinding discs and seats in globe valves, a plug type disc valve is used. However, the same method applies to other globe and angle valves except those with composition discs. Procedure is as follows:

Hold valve firmly in a vise with stem vertical. (Illustration #1A)

Remove the bonnet assembly and examine and clean all parts thoroughly. Remove stem from bonnet, place in vise and unscrew disc stem ring. (Illustration #2A)

Lift out stem, insert a spacer or coin inside of disc. (Illustration #3A)

Replace stem and tighten disc stem ring. The spacer takes up the clearance between the disc and the stem. Apply an emery base grinding compound on both disc and seat. A light coating of compound is all that is necessary. (Illustration #4A)

Place body and bonnet together and if the valve is a union bonnet design the union ring should be screwed on, but not tight. In case of a bolted bonnet insert a couple of bolts, but do not tighten the bolts. This will provide a guide for the stem. (Illustration #5A)

With firm hold on hand wheel applying pressure oscillate steadily until all pitting is removed and a continuous smooth bearing on the seating surface is obtained. Grind no more than is necessary for good bearing. When grinding is completed, clean the disc seat and body of all compound. (Illustration #6A) Again use Prussian Blue similar to the gate valve to determine if a good bearing has been obtained. Valve can then be reassembled, but be sure to remove the spacer from the disc to give it free swivel action on the stem.

When the body seat rings have been damaged beyond repair, they should be replaced. This can be accomplished using a tool specifically designed for the purpose, or by means of a bar fitted into the lugs or slots in the body ring. Before using valve it is advisable to give it a pressure test to be sure of tightness of seat and stuffing box.

Composition Discs

Replacing a composition disc in a globe or angle valve as soon as a seat leak is discovered, will add much to the valve's life. The procedure is easy.

Simply turn the stem to fully open position to prevent the disc holder from falling off the stem. Unscrew the bonnet joint and lift out the bonnet assembly (Illustration #1B). Turn the stem down slightly until disc holder slips off in the hand. Remove the disc retaining nut on the under side of the holder, and replace the disc. Reassemble the valve and it's ready for service again.

Where frequent disc changing is necessary, keep a few extra disc holders and discs on hand. Holders can be loaded with discs for various services when convenient. This feature simplifies maintenance and parts stocks problems for composition disc valves.

Speed Control and Efficient Operation of Turbines

(Continued from page 48)

first electric drive ship in the United States, the U. S. S. *Jupiter*, had the lowest maintenance cost of any vessel in the fleet and naturally her availability record was the highest.

Therefore, supplying turbines with clean steam and clean lubricating oil goes a long way toward keeping costs down. Before making a definite statement that turbines should be opened for inspection at regular intervals, it is well to consider the particular conditions under which the equipment has been operating. The underwriters have a specified length of time between surveys. This ruling must of necessity be arbitrary but it should be considered by owners as a maximum length of time between inspections as it is based on first class operating conditions. The Port Engineer therefore must use his own judgment on the need of inspections. He must be governed by the performance of the whole plant. A turbine should be opened up for examination if its steam supply has been contaminated and especially if salt has been the offender. The process of washing turbines with saturated steam is satisfactory on land installations but is very unsatisfactory on marine installations. The reason is that on the former the result is known by merely starting up and applying load while on marine turbines the ship must sail away before the results are known. So, if the fouling of turbines is suspected, after a siege of foul steam, they should be opened up and cleaned thoroughly and as a precaution the balance should be checked.

Best Wishes to Jack Frost

It is with best wishes that Fred Esser, owner and president of the Refrigeration Components Company, 15 Steuart St., San Francisco, announces that Jack Frost, his service manager for the past three years, has opened a domestic refrigeration business under the name of Acme Refrigeration Service in El Cerrito, Cal. Mr. Esser plans to announce Jack Frost's successor in the near future.

The George Washington

(Continued from page 46)

plumbing, wiring and piping were also put in.

Crew's Quarters

A major conversion on the *George Washington* was the moving of the entire crew's quarters to a different location on the ship, making them more spacious and modern.

Cargo Spaces

The forward hold was made into a refrigerated cargo space of 39,000 cu. ft., requiring the addition of more refrigeration machinery. The zero hold has been designed to take fresh meat and vegetables north and bring back frozen Alaskan fish. The company passes up some opportunity for cargo, however, in order to adhere to its three times a month passenger schedule. On August 10, for instance, she arrived at and departed from Seattle the same day!

Kolstad Appointed Representative for Wilson

Art Kolstad of Kolstad Engineering and Sales Company, 38 Giralda Walk, Long Beach, Cal., has been appointed sales representative for Thomas C. Wilson, Inc., manufacturers of tube cleaning equipment.

After serving in the Navy for thirteen years, Kolstad resigned in 1922 from his last assignment to the Captain of the Yard's Office of the Charleston Navy Yard. He conducted his own experimental laboratory in Boston for two years and then went into radio research for a year. In 1926 he worked for Richfield Oil Corporation at the Hynes Refinery, and while there served in the capacity of foreman of the electrical department and boiler plant. In 1937 he was placed in charge of the Instrument Department at the Watson Refinery. Kolstad resigned in 1942 to take up sales work in power plant equipment.

Art Kolstad

M. J. Gigy Appointed Representative for Varec

The Vapor Recovery Systems Company has announced the appointment of M. J. Gigy & Associates, 112 Market St., San Francisco, as their exclusive marine equipment representatives in San Francisco and the Bay Area. The organization will be available on a twenty-four hour basis as a source of supply for their complete line of relief valves, flame arresters and other gas control and safety devices. Service may be obtained by calling YUkon 6-2803 during the day and THornwall 3-4212 at night.

American Welding Society Booklet

By publication of the *Rules for Welding Piping in Marine Construction* (5 pages) the American Welding Society has endeavored to effect a uniformity in the classification and basic welding requirements for piping of the governing agencies in the shipbuilding industry. Since issuance of the first edition in 1938, these Rules have represented agreement among these governing agencies and the shipbuilders themselves. In this new edition two important points have been revised and thereby clarified: materials and classification of piping.

In connection with the changes in classification requirements it should be pointed out that they have also been broken down into more specific groupings, making classification for given service conditions far more simple.

Copies of the *Rules for Welding Piping in Marine Construction* can be obtained from the American Welding Society, New York City, at twenty-five cents each.

Why Freight Rates Go Up

The Maritime Commission's recent investigation into rates, charges, regulations and practices of Matson Navigation Company resulted in a decision (August 24) that Matson's proposed rate structure was reasonable and that the company was being well managed.

It was brought out in the hearing that vessel and cargo expenses on actual tonnage carried in the Pacific-Hawaiian service have increased (1947 over 1941) by the following percentages:

Insurance	123.85%
Repairs	19.96%
Sea expense	89.93%
Cargo handling	102.27%
Port charges	30.82%
TOTAL	93.36%

(on a weighted basis)

Expenses in 1947 divided approximately 61 per cent to cargo and 39 per cent to vessel.

Diesel Engine Manufacturers Panel

Gordon Lefebvre

Thirty-Fifth National Foreign Trade Convention

The Thirty-fifth National Foreign Trade Convention will be held at The Waldorf-Astoria, New York City, Monday, Tuesday and Wednesday, November 8, 9 and 10, 1948. American businessmen engaged in foreign commercial operations, representatives of associations and public interest groups, and others desirous of advancing American foreign commerce and improving international economic relations, are invited to register and attend. Registration may be made through the National Foreign Trade Council, 111 Broadway, New York City.

Speaking at the convention will be outstanding authorities on the basic issues of our foreign trade and investments.

New Warehouse Constructed By Andrew Brown Company

A new warehouse was recently constructed by the Andrew Brown Company in Los Angeles, makers of industrial finishes, marine paints and aviation coatings. The new building is located adjacent to the main plant at 5431 South District Boulevard and is served by the Los Angeles Junction Railway. It is of fireproof concrete and steel construction and contains 15,000 square feet of floor space.

The warehouse has loading facilities to accommodate two freight cars and will be used for packaged storage. The firm is planning to construct a new industrial finish plant at Dallas, Texas, in the near future.

On Thursday, October 14, 1948 a panel titled "Users' Experiences with Diesel Engines" will be held by the Diesel Engine Manufacturers Association at The Waldorf-Astoria Hotel, New York City. The panel, starting at 9:30 a.m., will be held for the American Merchant Marine Conference which is to be conducted by The Propeller Club of the United States.

Acting as chairman of the panel will be Gordon Lefebvre, president of the Diesel Engine Manufacturers Association and president of The Cooper-Bessemer Corporation. Otto H. Fischer, vice-president of the Diesel Engine Manufacturers Association and president of The Union Diesel Engine Company, will be co-chairman.

Speakers of the panel will survey the future use of Diesel engines in their special fields. The theme of the conference is "The American Merchant Marine Looks Ahead."

Cutler-Hammer Acquires Los Angeles Plant

Recognizing the rapid industrial expansion in the Los Angeles area and the ever increasing need for electrical apparatus in that territory, Cutler-Hammer, Inc., pioneer electrical manufacturers, Milwaukee, Wisconsin, have acquired the business of the West Electric Products Co., 1795 Pasadena Avenue, Los Angeles.

W. G. Tapping, Cutler-Hammer District Sales Manager, will be in charge of the new plant. Sale of the firm's products in the Los Angeles area will continue to be handled by the Company's sales office located at 1331 Santa Fe Avenue, Los Angeles.

The present operating personnel of the West Electric Products Company will be retained as Cutler-Hammer employees. The new plant will be integrated with other Cutler-Hammer plants in the manufacture of motor control, panelboards, lifting magnets, magnetic brakes, electric heating devices and allied electric apparatus.

Stress Analysis Meeting

The annual meeting of the Society for Experimental Stress Analysis will be held at Hotel Commodore, New York City, on December 2, 3, 4, 1948. Inquiries should be addressed to the Society for Experimental Stress Analysis, P. O. Box 168, Cambridge 39, Massachusetts.

Submarine Naval Architecture

(Continued from page 54)

such that, when the main and fuel ballast tanks are completely filled, her weight and displacement must be equal, and their longitudinal moments must be equal. This is because during submergence, which takes considerably less than a minute, there is no time to measure the amount of water taken aboard except to let the ballast tanks fill completely. In actual practice a submarine is usually slightly heavy or light and the longitudinal moments are slightly unbalanced at the time of submergence. By using moderately high speed and using rise and dive angle on the diving planes or even on the whole ship, it is possible to carry an error of several tons in weight and of several hundred foot tons in moment. But a final trim must be obtained by flooding or pumping variable ballast tanks before the ship can maintain depth accurately at a speed slow enough for periscope observations.

It is important that the diving time be very short. Even after the ballast tanks are full, a considerable amount of time is required to move the ship downward about 35 feet until she is out of sight. To reduce the time for moving the ship downward this distance, the forward ballast tanks are provided with larger flooding holes and vents so that they will flood more rapidly and give the ship a down angle during the dive. The bow planes are also placed at a dive angle to assist in obtaining an angle on the ship. After the ship is completely submerged, both the bow planes and the stern planes are used to level off the ship at the desired depth.

For large changes in depth, the stern planes are used to give the ship a down or up angle. The bow planes assist, but their effect is relatively small for this purpose. The bow planes are most effective in maintaining a constant depth accurately.

When one or more torpedoes is fired from the bow, the ship immediately becomes light forward by the weight of the torpedoes. Much of this weight is recovered as soon as the torpedo tubes reflood but it is necessary to add some additional water forward before the ship is in equilibrium, because a torpedo at the start of its run is a good deal heavier than the water it displaces. Only the bow planes are useful at this time to prevent broaching, for any attempt to give the ship a down angle by means of the stern planes would lift her bodily and almost certainly cause her to broach.

The size of the bow and stern planes is determined after an analysis of the performance of preceding submarines, particularly those which could not be controlled easily under all conditions. The task required of the diving planes is not an easy one, for they must be able to maintain the depth of the ship within one foot of the desired depth at only two knots speed. It is considered important that they meet this requirement, especially by people who have been able to see only green water while trying to see a target when the ship was a little below priscope depth.

Noise

Although it is not a highly stressed subject in the study of Naval Architecture, the amount of noise transmitted to the water by the machinery which must operate while a submarine is submerged is a matter of much concern to a Submarine Naval Architect. It is of even more concern to the crew of a submarine when they know that an enemy patrol vessel is on the surface, listening intently through the best microphones and amplifiers and anxious to drop a depth charge pattern on any underwater noise it can detect. Although some progress had been made in reducing the noise of the machinery, the stimulus of the war made the progress much more rapid. By the time the war ended, the noise energy transmitted to the water had been reduced by 99 per cent from that at the beginning of the war.

Speed and Power

As the transverse sections of the pressure hull of a submarine are necessarily circular or nearly so, they must be kept reasonably small in diameter to avoid excessive draft in the surface condition. This requires that the spaces required for various purposes be strung along the length of the ship. Hence the length is determined largely

by space considerations. It usually comes out at a figure which gives a speed-length ratio between 1.0 and 1.2. This makes a rather low longitudinal coefficient desirable. The diameter of the pressure hull required to contain the main motors and the necessity for having sufficient space between the inner and outer shells for maintenance of the structure make it very difficult to keep small the sectional areas in the middle of the fore body and after body. Deliberately increasing the midship section area to keep the longitudinal coefficient small gives too much main ballast tank capacity. So it is almost always necessary to accept a coefficient which is larger than desirable for minimum resistance at high speed, and often it is necessary to accept a hard spot in the section area curve in way of the main motors.

It is also difficult to work out a reasonably fair surface near both ends of the ship. The sections should be at least almost circular at the ends of the pressure hull which come 15 to 20 feet from the ends of the ship. The transition from this circular shape to a shape which is satisfactory for the torpedo tube shutters in the closed position always results in some unfairness of the lines and local irregularities in the section area curve.

From a submerged resistance viewpoint, it is desirable that the structure above the waterline be well faired. During the recent war other considerations, such as a small silhouette to reduce the danger of detection on the surface at night and the desirability of carrying a fairly heavy gun battery, reduced the emphasis on underwater resistance. The present tendency is to reduce underwater resistance to the greatest practicable extent, even at the expense of desirable surface characteristics. The varying degree of emphasis which has been placed on submerged speed has caused extreme variations in submerged resistance. In the past, the submerged resistance has always been greater than the surface resistance at the same speed. It is possible that the submerged resistance can be made slightly less than the surface resistance if submerged speed is desired to such an extent that a material sacrifice in surface speed is acceptable.

Low Temperature Air Conditioning

(Continued from page 79)

fact that because of coil spacing not all the air comes in contact with the cold metal surface. In other words, a certain amount of bypassing occurs. By means of elaborate factory tests this deficiency of coil surfaces can easily be established. As a result when using cooling coils, this inefficiency of the cooling surface must be taken into account and compensated for by increasing the air quantity.

Bypass factors of coils such as used in commercial cold diffusers vary considerably with type of construction. As an example we list two types:

8-row coil, 3 fins per inch— .30 to .34 bypass factor
10-row coil, prime surface— .50 to .56 bypass factor

By means of an example it is simpler to explain the effect of coil bypass on air quantity. Taking again our citrus example, the following design conditions are specified:

Compartment conditions:	32°F—85% R.H. 28½° DP
Sensible heat factor:	.85
Apparatus DP:	27½° F.
Load assumed:	3 tons of refrigeration.

For the above requirements, the air quantity required may be calculated from the following equation:

$$\text{CFM} = \frac{\text{Sens. Ht. load (BTU/hr.)}}{1.15 \times (\text{Room temp.—App. DP})}$$

$$\text{CFM} = \frac{.85 \times 36{,}000}{1.15 \times (32-27\tfrac{1}{2}^\circ \text{F})} = 6{,}000$$

Factor 1.15 used in the above equation varies from 1.08 to 1.26, depending on the temperature range for a particular application. Density of the air affects this factor and may be derived from the following universally known definition.

One BTU = Amount of heat required to raise one pound of water one degree in temperature—

or

BTU = Amount of heat required to raise "X" cu. ft. of air one degree in temperature.

$$X = \frac{\text{Cu. ft. per pound (at given temp.)}}{.2415 \text{ (sp. ht. of air)}}$$

For 32 F conditions we find that one BTU equals the amount of heat required to raise $\frac{12.4}{.2415} = 52$ cu. ft. of air one degree in temperature. Taking into account that there are 60 minutes in an hour, the factor to use will be $\frac{60}{52} = 1.15$.

It should be noted that the sensible heat load, and not total heat load, is used to establish the air quantity. This quantity of air would be required provided the air

(Please turn to page 89)

The Exponent

(Continued from page 62)

is $\frac{1}{4}\pi \mathrm{x} 12LD^2$ cubic inches. The mental process used by the reader in checking the truth of this statement is dimensional analysis. Furthermore, in multiplying units of the same kind together the result will be squared or *second power* of the unit. If multiplied three times, as in the example above, the result is the cube of the unit. The square of linear (length) units is an area and the cube (third power) is a volume. Four multiplications and more have no real meaning or require some further explanation. The fourth, fifth, sixth and higher powers are used in mathematical expressions, but final answers should not contain linear units at more than the third power.

A good example of dimensional analysis is the formula for horse power. PxLxAxN or PLAN comes out in foot pounds per minute, expressed as ft. lbs./min. as follows:

$$\overset{P}{\frac{\text{Lbs.}}{\text{in.}^2}} \quad \overset{L}{\text{Ft.}} \quad \overset{A}{\text{in.}^2} \quad \overset{N}{\frac{}{\text{min.}}} \quad \text{equals} \quad \frac{\text{Lbs. Ft.}}{\text{min.}}$$

Note the in.^{2} cancelled out. The above is complete except for the numerical *coefficients* (numbers showing how many).

While it is the mathematician that shows us how to combine symbols together, the results still have no meaning unless an engineer assigns values to the symbols. He does this by making measurements to apply coefficients to the symbols. The results, then, are the same symbols with new coefficients and a real meaning. Like the professional engineer who designs an engine, the mathematician designs a line of true reasoning. Like the operating engineer who operates the engine, the student of mathematics uses arithmetic and combines numbers as directed by the formula to get a number having real meaning. The marine engineer must be prepared a little beyond the arithmetic stage and understand the simpler steps and reasoning of the mathematician.

In our articles on this subject we must necessarily be using symbols without specific dimensional meaning. The exception will be in an occasional illustrative example or problem.

In the number (or symbol, as no dimension is assigned) 7^2, the figure 2 is called the *exponent*. The exponent may be any number, letter, decimal number, fraction, or negative number. It is also called the power of the number 7.

The exponent directs that the number 7 be multiplied by itself until in the multiplication the number 7 appears as many times as the value of the exponent. Thus in this example, 7^2 means or equals 7 times 7 or 7x7 or $7 \cdot 7$. The dot placed above its normal position as a decimal point means to multiply just as x or X does. It is used, as the letter x sometimes may be confused with other symbols in the expression, and to place two numbers together such as 77 means something different than 7 times 7. Incidentally, 77 means 7 times 10 plus 7. However, letters are placed together to mean multiplication and aa means a times a or a^2. If there is any possibility of confusion the dot should be used. For instance Lbs. means pounds but it might also mean L times b times s. Thus in formulation, mathematicians seldom use two symbols to mean one thing, and would use w for weight and not Lbs. If we do want to use two or more letters for one thing we should use the dot. Thus Lbs times ft. could be Lbs·ft.

In engineering we are so familiar with Lbs. or lbs. and ft. as abreviations that we frequently just use lbs. ft. It is not strictly correct and confuses students. Thus ordinarily we will try to confine ourselves to one letter symbols. This in itself is a step forward for the engineer in his study of mathematics.

Note that multiplication is multiple addition. 3x4 equals 3 added to itself 4 times. A calculating machine multiplies simply by adding many times. Division is multiple subtraction. 13 divided by 3 is to subtract 3 from 13 until the remainder is less than 3. The first subtraction gives 10, the next 7, then 4 and then 1. This makes 4 subtractions and a remainder of 1. The result is 4 and 1/3.

In like manner the operation of multiple multiplication of the same number is called *involution*. And using any letters we want, we say that a x a x a (b times) equals a^b equals c. Then c is the b power of a.

Thus 4x4x4x4 equals 4^4 equals 256. And $a \cdot a \cdot a \cdot a$ equals a^4.

4x4x4 times 4x4 equals $4^3 \mathrm{x} 4^2$ equals 4^{3+2} equals 4^5.

In general, a^b times a^c equals a^{b+c} and we can say that the product of two powers of a number is that number raised to a power that is the sum of the two powers. a^2 times a^3 is a^5. We *add* the exponents in multiplying powers. This is an important conclusion and we will have occasion to refer to it again.

Our next article will discuss the meaning of zero and negative numbers as exponents.

Howard Butt

Howard Butt Passes

Howard Butt, Vice-President and Manager of the New York Office of The Wm. Powell Company, died at his home, Morristown, N. J., on August 23, in his 58th year. Mr. Butt was associated with several large engineering organizations in sales, engineering and managerial capacities. In 1930 he joined The Wm. Powell Company, valve manufacturers of Cincinnati, Ohio, and was made a vice president in 1944. He was widely known in engineering circles and the valve industry, holding memberships in D.T.A.C., Engineers Club of New York Economic Club, A.S.M.E., Spring Brook Country Club (Morristown), and Sky Top Lodge (Pennsylvania).

Low Temperature Air Conditioning

(Continued from page 87)

leaving the cold diffuser fan is 27½°F and 100% R.H. The temperature rise between air leaving the fan and entering the coils (return air from compartment) is 4½°F.

As explained in the foregoing, the air leaving the fan cannot be 100% saturated, or at the dewpoint, because of the bypass effect of the coils. Knowing the bypass factor for a given coil, we can calculate the temperature rise from the following equation:

Temp. Rise = (1—BF) (Room temp.—App. DP).

Assuming a BF of .5, we find:

Temp. Rise = (1—.5) (32°F—27½°F)
= .5 x 4½° = 2¼°F.

Air quantity therefore becomes—

$$\text{CFM} = \frac{.85 \times 36{,}000}{1.15 \times 2.25^\circ \text{F.}} = 12{,}000.$$

In other words, twice the amount of air is required to maintain design conditions as before, and the air leaving the fan would be 29.75 (approximately 90% R.H.) (Point "D").

From the foregoing analysis we may deduce that haphazardly reducing air quantity, or reducing the refrigerant or brine temperatures is not conducive to the comfort of the product stored or carried.

It is our hope that the time will come when a course in the fundamentals of air conditioning will become standard in the curriculum of a marine engineer's training. The result will be a considerable reduction in cargo claims.

In conclusion, may I point out that the fundamentals explained in this paper are important in the design of a cargo reefer system, but that it should be recognized that because of the great variation in conditions required because of variable cargo, practical experience in the design must be counted on to a large degree. It should not be overlooked, however, that in the planning of such a plant an attempt should be made to reach the optimum of perfection, even though we know that allowances must be made for inaccuracies.

A Big Party

July 20th was the 2nd anniversary of the founding of the Pacific Far East Line and 2500 shipping people gathered at San Francisco's Fairmont Hotel to join in a celebration. In the above picture Admiral Louis E. Denfeld, Chief of Naval Operations, listens while Senator William Knowland insists, over the head of modest Thomas E. Cuffe, president of Pacific Far East Line, that this is the biggest, best and heartiest 2nd anniversary party that Pacific Far East has ever put on.

Ernie Low Calls

September visitor to his old stamping grounds around California maritime areas was Ernest C. Low, general sales manager of John A. Roebling's Sons Company, out from Trenton, New Jersey, headquarters. PMR camera shows Ernie (left) discussing bigger and better aquatics with Fred Booth, Jr., manager of Duplex, Inc.

Gamlen Entertains Herwig

Quint Herwig, president of Marine Service, Inc., Seattle, on a recent business trip to San Francisco was honored at a dinner given by the Gamlen Chemical Company. Mr. Herwig is Gamlen's distributor in the Pacific Northwest. Around the table, left to right: H. P. Schnitler, Interocean S. S. Co.; Mrs. Jack Litz; Quint Herwig; Jack Litz, Interocean S. S. Co.; Miss Alice Gamlen; R. A. (Allen) Gamlen; Mrs. Quint Herwig.

KEEP POSTED

New Equipment and

Literature for Yard,

Ship and Dock

Submarine Signal Company Develops Recorder For Small Craft

A new "straightline" recorder for small craft has just been perfected and is now in production by the Submarine Signal Company of Boston, Massachusetts.

The instrument gives a true and undistorted horizontal graph of the bottom contour within a depth range of 100 fathoms. It also discloses schools of fish and records their depth under the hull so that fishermen may cast their nets accordingly.

The entire equipment consists of a single control unit and one transducer to be mounted on the keel. All sounding and recording mechanisms are housed in one compact unit, only 15½" high, 14½" wide and 5⅞" deep. A large chart window (12"x7") permits one hour's recording to be viewed at a single glance, and the chart speed is 12" per hour or 72 hours per roll of paper for economical operation.

The equipment operates on 110 Vac or on 6, 12, 32 or 110 Vdc with vibrator packs supplied with the equipment as specified.

Submarine Signal Company recorder

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

.... issue. Page No. ....

....

....

....

(Identify by name of manufacturer and catalog)

NAME ....

BUSINESS ....

ADDRESS ....

....

Operating Procedures On Electric-Drive Vessels

(Continued from page 81)

amplidyne. The amplidyne receives its excitation from a voltage regulator which measures the propulsion line voltage with respect to the generator speed. Thus, when the voltage drops due to a sudden load demand, the excitation system operates instantly to increase the generator and motor fields to keep the machines in synchronism.

Likewise, when the load on the screw decreases or when operating at low speeds, the excitation is reduced to the required amount. This reduces the field temperature rise and improves the efficiency at light loads.

The motor and generator field circuits are so adjusted that the system always operates at unity power factor.

On the P2 vessels manual control of generator and motor excitation is used in conjunction with a booster regulator in the generator field circuit. Under normal operating conditions the generator and motor field excitation is supplied from the 120-volt DC source. Both excitation circuits are adjusted manually by means of field rheostats for current values recommended in the manufacturer's instructions.

These values allow a certain amount of torque over and above that required for normal operation. Setting the field values according to instructions at all speeds will give a power factor very close to unity.

The booster exciter is connected in one leg of the generator field circuit. Under normal operating conditions this booster exciter runs freely without field excitation. The field of the booster is controlled automatically by means of a voltage regulator which applies field only in the case of a drop in line voltage which results from heavy current demands caused by rudder movement and heavy seas.

The booster exciter voltage regulator combination assures that the proper voltage will be maintained regardless of the current demands, thereby preventing the motor from dropping out of step at all times.

Protective Devices

Phase Balance Relay: Under normal operation the current in each of the three phases of the propulsion system should be equal. If the phases become unbalanced a fault is indicated. Should one phase become open when the motor is in operation, the motor would continue to operate on a single phase basis. However, a high overload would be imposed on the remaining windings. If the motor stopped, it could not be started as a single phase motor.

To protect against unbalanced conditions and single phase operation a phase balance relay is installed on the control panels. This relay, through current transformers, measures and compares the three line currents. If the phases become out of balance by 25 per cent or more the relay operates to open the field circuit to the generator and motor. An orange target on the face of the instrument indicates when the relay has operated.

Ground Relay

The three-phase winding of the motors and generators are "Y" connected, one end of each phase being connected to a neutral point. This neutral point of the gen-

erator is grounded through a current transformer. The secondary of the current transformer is connected to the ground relay.

During normal operation no current flows through the ground connection. However, if a ground occurs in any of the phases current will flow through the ground connection and the ground relay will operate and trip the motor and generator field contactors. Like the phase balance relay a red target appears indicating the relay has operated.

Excitation Transfer Panel

The door to the excitation transfer panel is provided with an interlock which trips the motor and generator field contactors when the door is opened. Interlocks are also installed on all doors leading to high voltage cubicles and motor changeover panels. This prevents access by anyone unless the circuits are de-energized.

Care During Operation

From the operating engineer's point of view the electrical apparatus requires little supervision during operation. Instruments are provided that show the operator what is happening within the generator and motor. Periodic temperature checks of the windings should be made using the temperature indicating devices provided. Operation within the design temperature limits of the machines insures against insulation damage caused by overheating.

Care should be taken in adjusting the flow of water to the motor and generator air coolers. The temperature of the air to the windings should never exceed that stated in the manufacturer's instructions. Likewise, the temperature of the air should never be allowed to fall below that corresponding to its dew point. This prevents moisture from forming within the machine enclosures. A good general rule is to keep the air temperature to the windings about 5° F. above the engine room ambient.

The collector rings, brush rigging, and brushes should be inspected regularly to make sure that everything is tight and working smoothly and that the brushes are riding free in their holders.

The lubricating oil sight glasses should also be looked at periodically to see that a steady stream of oil is being supplied to the bearings. The temperature of the oil from the bearings should also be checked.

The main essentials in the care of the control equipment are cleanliness and tight connections. There are few wearing parts, namely the contact tips. These should be cleaned of irregularities at regular intervals to insure good contact. All insulation should be examined periodically for signs of cracks which might allow moisture to enter.

Conclusion

Although turbine electric drive appears to have taken a back seat in the present shipbuilding program, this form of propulsion still has a place in the powering of ships. There are many applications that require special characteristics which can only be supplied by electric drive. Dredges, salvage boats, bulk freight carriers, cutters, ferry boats, and tugs can all use electric drive to advantage.

Improvements on present systems, and other types of electric drive are constantly being studied. Gas turbines and electronic tube controlled motors are now in the developmental stage.

72-Ton Reverse Flow F-W Condenser

This 72-ton reverse flow condenser, which will form the base of the largest condenser-mounted turbine-generator (20,000 kw) ever built in this country for stationary power plants, is shown emerging from the Carteret, N. J. plant of the Foster Wheeler Corporation on its way to the new station of the Rockland Light & Power Company at Tomkins Cove on the Hudson River near Stony Point, N. Y. This condenser is a development of a design used in marine practice and resulted from the co-ordinated efforts of Foster Wheeler Corporation, General Electric Company, and Burns and Roe, Inc., engineers. Arranged for single pass flow of circulating water and of divided water box construction, this condenser will condense 13,500 lb. per hour of steam and maintain a pressure of 1 in. mercury absolute at the condenser inlet when circulating 25,200 gpm of water at 60° F through the tubes. It has a surface area of 18,650 sq. ft. consisting of 7/8" OD tubes having an overall length of 32 ft. When installed, the turbine-generator will be mounted directly on the condenser and there will be a rubber expansion joint between the turbine exhaust nozzle and condenser inlet.

72-ton reverse flow condenser

General Engineering and Drydock Changes Hands

Announcement was made on September 1 of a change in the corporate structure and ownership of the General Engineering & Drydock Corporation of San Francisco and Alameda. The Delaware corporation is dissolved and all operations will be continued by a California corporation of the same name. Headquarters continue at 1100 Sansome Street, San Francisco.

Ownership passes to the Loyola University Foundation but officers and business activities, including shipyard operation, will remain the same. The company will regularly bid on ship jobs. The officers are: Godfrey K. Waters, chairman of the Board; W. L. Montgomery, president; Frank H. Fox, vice president and manager; Al Wanner, vice president and director of purchasing; Peter P. Msquita, secretary; E. J. Trask, treasurer; Fletcher Monson, sales manager.

Commercial Ship Repair Opens Branch in Tacoma

Barney Trout, general manager of the newly established Tacoma plant of Commercial Ship Repair, is one of four brothers of a well known marine family. Captain Vance Trout is now operating manager and vice president of the Coastwise Line, San Francisco; Damon Trout heads the Marine Electric Co., Portland; and Matt Trout is vice president of the latter organization.

Commercial Ship Repair announces that they have opened a branch at 2506-11th Street in Tacoma. The new facility is an expansion of their present operations at Pier 66, Seattle, and Winslow, Washington, and will enable them to give the Tacoma area the same service now being offered in Seattle.

Barney Trout, who is well known to the Pacific Coast shipping industry, will be in charge of the new Tacoma plant, which will be equipped to handle any type of repair. Trout has been connected with various repair yards since 1930 and has spent most of this time in the Puget Sound area.

Commercial Ship Repair has completed repairs on 412 ships this year and has also built three new steel 45-foot tugs for the City Light Department, plus a new steel oil barge for the Washington Tug and Barge Co., which was 140 feet long, 36 feet wide, costing approximately $120,000.00 Operations in Winslow consist of repairs and drydocking, new construction, and steel fabrication. In Seattle and Tacoma all types of dockside repair are handled, including complete service for any type ship or any type job regardless of size.

Commercial Ship Repair now employs approximately 300 men and has been in operation for the past three years as a co-partnership between Edward E. Black and J. J. Featherstone.

Engineering Index Service

Engineering Index, Inc., carries on an index service which provides an up-to-date record of information in various fields of engineering. Important articles in current engineering literature are abstracted and classified by a staff of qualified editors, and published on standard library-sized cards which are mailed to subscribers at the end of each week, providing a ready reference file containing subject heading classification, title of article and author, name and date of publication and a brief summary of the article. All publications indexed are permanently filed in the Engineering Societies Library, 29 West 39th Street, New York City, which will supply photoprints, microfilm or translations of the complete text of any reference supplied by the Engineering Index. The Engineering Index card service covers 287 divisions of engineering. Rates for the service depend on the particular field of interest.

In addition to the card service, Engineering Index also issues an annual volume, compiled from the cards in all engineering fields, priced at $50.

The *Pacific Marine Review* is indexed regularly by Engineering Index, Inc.

Pilferage

(Continued from page 59)

food, and upon these committees representatives of shipping will be invited to serve.

In view of these developments, the council of the Chamber have agreed that the existing Pilferage Sub-Committee of the Cargo Losses and Damages Committee should be reconstituted on a wider representative basis, in such a way as to secure adequate representation of liners, tramps, the coasting and short sea interests and managers of protection and indemnity clubs. The task of this new committee will be to co-ordinate information regarding pilferage, not merely in United Kingdom ports but ports abroad, and to be prepared to advise the Government Departments concerned and such bodies as the Liverpool University on the matter. The Liverpool Steam Ship Owners' Association and the Shipping Federation have been invited to appoint representatives to the committee, or to co-operate with its work in such other way as may be appropriate.

Casting of Steel from Liquid Phase to Semi-finished Shape

In an announcement by Babcock & Wilcox Tube Company and Republic Steel Corporation, it is claimed that the dream of inventors for a century, that steel might be made from the liquid phase to semi-finished shape in one simple, relatively inexpensive machine, has become a reality.

The new method and apparatus are considered a timely response to great economic pressure to serve areas locally. Interest in the possibilities of continuously cast semi-finished steel is enhanced by current uneasiness over high break-even points and the doubled and tripled cost of new productive facilities.

The greatest single advantage of their process is that it removes from the conventional process of steelmaking the most massive and expensive parts of such plants, such as equipment for ingots, soaking pits, and the blooming mill. Instead, continuous casting permits passing directly from the melt to semi-finished sections ready for secondary mills with the result that not only is the capital cost for a given output greatly reduced, but also maintenance and operational costs. The work accomplished to date makes it clear that for the production of relatively small quantities of steel and particularly as a means of decentralizing steel production, this new development exactly fills the requirements of low capital and low operational costs.

Safety Record at Todd's San Pedro Yard

It's news when 1,000 ship repairmen and drydock workers complete a period of 34 work-days without a lost time occupational injury. This is the recent record of Todd Drydocks, San Pedro, California. Much credit is given by this company for its splendid record to active union membership participation in employee safety committee activities.

Workmen observed violating safety rules are at first cautioned. If they persist in disregarding them they are issued a violation ticket, copy of which goes to the union steward, and the original to management. Disciplinary action is geared to the seriousness of the offense.

The result is improved housekeeping throughout the yard, shops, and aboard ships undergoing repairs. Men working in the drydock, where others are working overhead, are equipped with hard hats, and compliance appears to be 100 per cent. Adequate gangplanks, well maintained, are equipped with life nets. Open holds are provided with man rope guards. Attainment of 34 work-days free of disabling injuries for 1,000 workers is convincing evidence that here is a program that pays dividends.

"Selling to the Navy"

The new Navy Department booklet entitled, "Selling to the Navy" answers the need of business men for Navy procurement information. It is particularly valuable to the smaller business concerns to acquaint them with the manner in which Navy contracts are obtained and the steps involved from the receipt of the contract until final payment. The list of Navy purchasing activities throughout the U. S. and the directory of field inspectors of Navy material provide the primary contact points for suppliers.

Purchasing function is divided into the following bureaus: Bureau of Aeronautics, Bureau of Ordnance, Bureau of Ships, Bureau of Supplies and Accounts, Bureau of Yards and Docks, Office of Naval Research, Headquarters Marine Corps, Bureau of Medicine and Surgery, Bureau of Naval Personnel.

The list of purchasing facilities includes the following on the West Coast: Naval Shipyard, Bremerton, Wash.—for general procurement; Navy Purchasing Office, Los Angeles—for procurement of construction equipment; Marine Corps Depot of Supplies, Oceanside, Calif.—for general procurement for Marine Corps; Army-Navy Lumber Agency, Portland, Ore.—for procurement of lumber; Marine Corps Base, San Diego, Calif.—for general procurement; Navy Purchasing Office, San Francisco — for general procurement; Marine Corps Depot of Supplies, San Francisco—for general procurement; Marine Corps Air Station, Santa Ana, Calif.—for general procurement; Naval Supply Depot, Seattle, Wash.—for general procurement.

"Selling to the Navy" is the third edition of a booklet first published in 1922. Copies are available from the Navy Department, bureau contracting officers, officers-in-charge of the field purchasing offices, and field inspectors of Navy material.

Martignoni Presented Navy Award

Admiral Beary pinning Navy's Distinguished Public Service Award on Walter L. Martignoni at a special ceremony in the Federal Building, San Francisco. A large group of people prominent in shipping and commerce were present. Partially hidden are Brayton Wilbur, former president of the San Francisco Chamber of Commerce; Captain A. F. Pillsbury, partner of Martignoni; and Lloyd Fleming, Pacific Coast Director, U. S. Maritime Commission.

Walter L. Martignoni, San Francisco Marine Surveyor and Consulting Engineer, was presented the Secretary of the Navy Distinguished Public Service Award September 10 by Rear Admiral Donald B. Beary, USN, Commandant of the Twelfth Naval District, at the Federal Office Building, San Francisco.

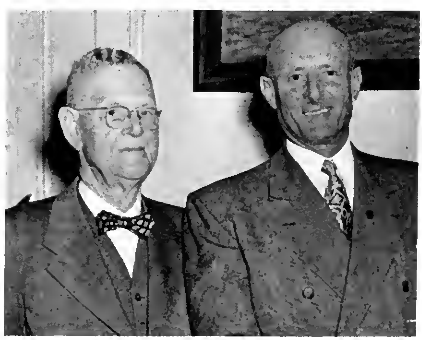
The Secretary of the Navy's highest civilian award was presented to Mr. Martignoni for his wartime service in converting allied merchant ships to Navy use. He served as Pacific Coast Director of Maintenance and Repairs, War Shipping Administration, from April 1942 to December 1945. During that time, he supervised all merchant ship repairs and maintenance in the Pacific Coast District.

He organized and administered the Division of Construction and Repair and built up repair facilities which kept ships moving despite wartime difficulties.

Mr. Martigoni is an important part of the firm of Pillsbury and Martignoni in the Mills Building.

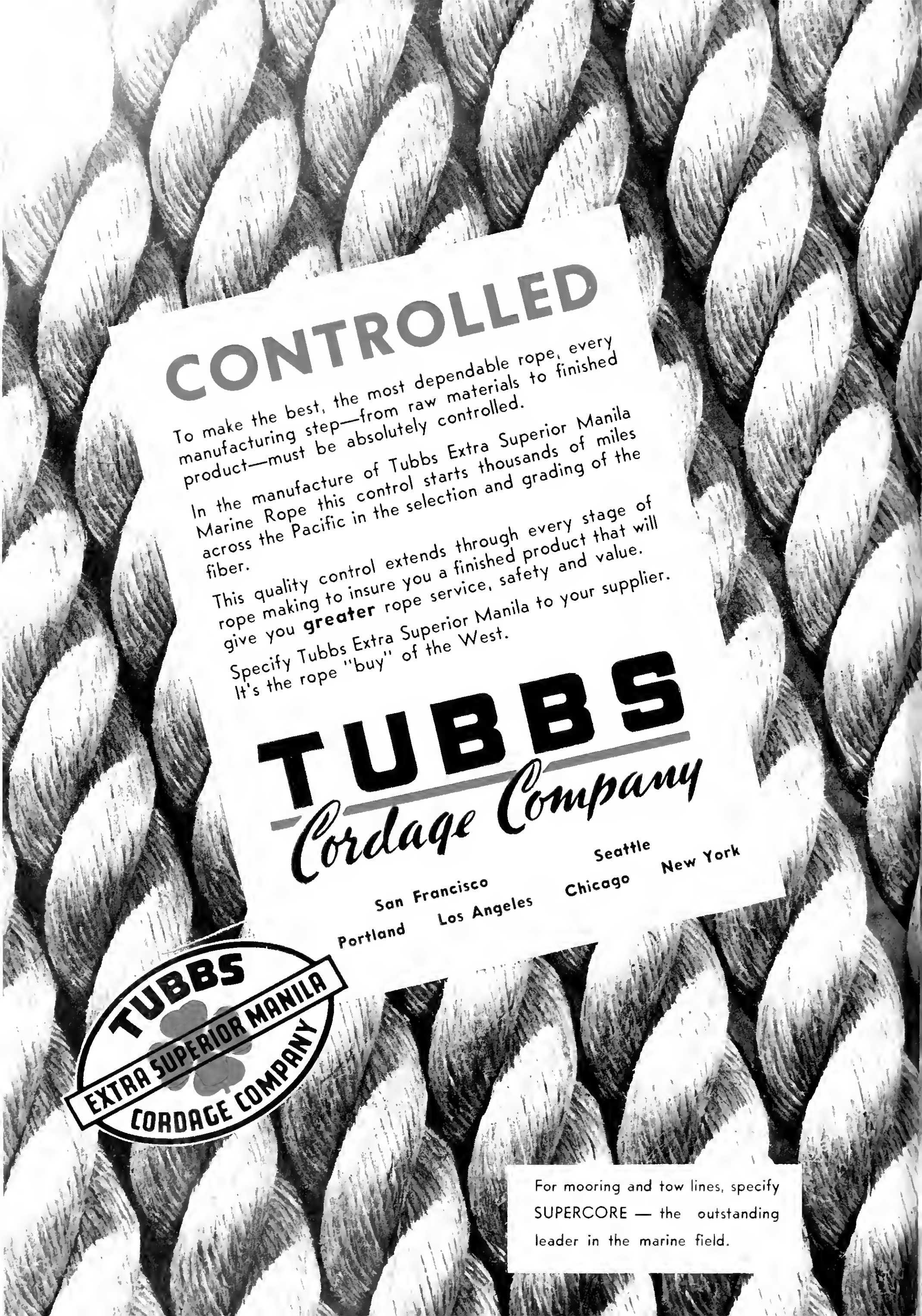
It will be recalled that Mr. Martignoni supervised the epic salmon salvage job on the *Diamond Knot*, which is still being discussed in marine and insurance circles. It was described in the April *Pacific Marine Review*.

Pillsbury and Martignoni



Pacific
MARINE
REVIEW

NOVEMBER, 1948


CONTROLLED
To make the best, the most dependable rope, every manufacturing step—from raw materials to finished product—must be absolutely controlled.
In the manufacture of Tubbs Extra Superior Manila Marine Rope this control starts thousands of miles across the Pacific in the selection and grading of the fiber.
This quality control extends through every stage of rope making to insure you a finished product that will give you **greater** rope service, safety and value.
Specify Tubbs Extra Superior Manila to your supplier. It's the rope "buy" of the West.
TUBBS
Cordage Company
San Francisco
Portland
Los Angeles
Seattle
Chicago
New York
TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY
For mooring and tow lines, specify SUPERCORE — the outstanding leader in the marine field.

Pacific MARINE REVIEW

INES
Publisher

DeROCHIE
Assistant Publisher

GLAS MacMULLEN
Editor

FAULKNER
Advertising Manager

DeROCHIE, Jr.
Sales Promotion Manager

THY GRAVES
Assistant to Editor

J. DeROCHIE
Los Angeles Advertising-Publicity

ANGELES OFFICE
hire Blvd., Beverly Hills
e—BRadshaw 2-6049

AN FRANCISCO
one—GArfield 1-4760

rine Review is indexed
by Engineering Index,

MEMBER AUDIT BUREAU OF CIRCULATIONS

ription rates:

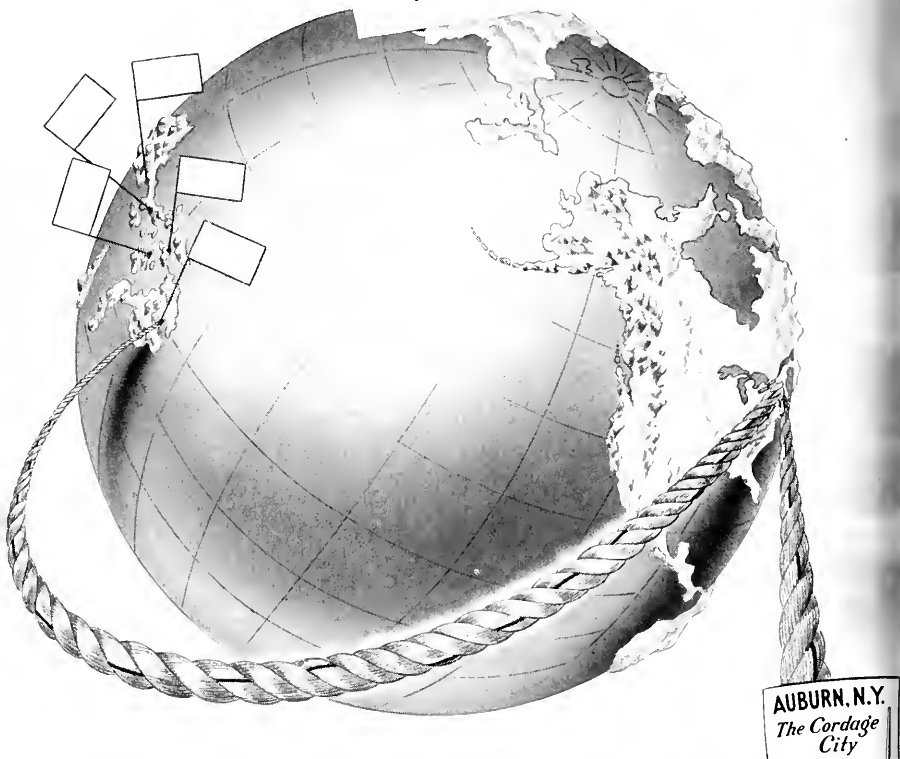
ar, $2.00; two years,
ree years, $5.00; for-
0 additional per year;
pies, 25c.

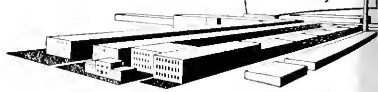
TABLE OF CONTENTS - - - - - - NOVEMBER, 1948

PUBLISHED AT 500 SANSOME STREET • SAN FRANCISCO 11, CALIFORNIA

COLUMBIAN is QUALITY-CONTROLLED

. . . from fibre to you . . .





In addition to our prewar organization at Davao, we recently established bodegas at Tacloban, Cebu and Tigaon as well as an office in Manila.

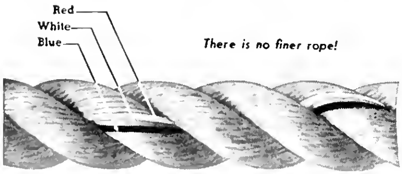
Quality, in the final analysis, is the true measure of any rope. And quality-controlled rope like Columbian Tape-Marked depends on pure manila fibre . . . durability . . . strength . . . flexibility . . . and the Organization that produces it.

In the Philippines where the finest manila fibre is produced, Columbian resident buyers select the finest crops of the abaca tree. The fibre is then delivered in bales or "bultos" to Columbian's own bodegas (grading and packing plants) in Mindanao, Leyte, Cebu and Luzon.

Under strict Columbian supervision, the fibre is cleaned, cut, graded and baled for shipment by expert Filipinos. Finally, after due inspection by government officials, the bales are sent to the cordage city — to Columbian's plant at Auburn, N. Y.

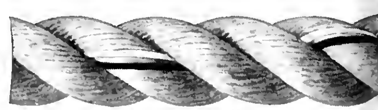
Here under the same quality-controlled standards, Columbian produces the famous Tape-Marked Rope — the rope of the nation. On land and sea . . . and in the air . . . where dependability is vitally essential, quality-controlled Columbian Tape-Marked pure manila rope is the choice of men who know.

COLUMBIAN ROPE COMPANY
400-90 Genesee St., Auburn, "The Cordage City", N.Y.



There is no finer rope!

TAPE MARKED



Pacific Marine Review

When Wounds Heal

THERE ARE CRUCIAL TIMES in history when seething unrest and supercharged antagonisms reach explosive proportions, and it seems as though peaceful relationships are gone forever; but there is a natural level of harmony on which nations and individuals eventually rest, just as stormy seas become calm. We forget easily, as we seem to have with Germany, Japan and Italy.

It is becoming rather obvious that the West Coast maritime strike will end soon, and that, as with wars, revolutions and family spats, a normal trend will be resumed. Since certain phases of waterfront activity had just about reached bottom, any change can only be for the better; hence, with bitter animosities somewhat relieved, there may be opportunity for accomplishment.

It may be, for instance, that labor and management and shippers and civic groups will pull *together* in an effort to restore coastwise ship service and increase intercoastal traffic. We think these services are far more important to the prosperity of the ports than the mere distribution of foreign shipping *among* the ports, east or west. In fact, restored domestic shipping would mean a lot to foreign shipping too, in more ways than one. And it would also put the shipyards and marine supply firms in a safe and prosperous status. To these ends every phase of civic energy can be profitably bent.

During the strike period it has been brought home to most people that prosperity mushrooms uptown from shipping, and whether he likes it or not every citizen has a stake in waterfront activities. But he will not remember this unless organized publicity keeps reminding him. If the industry will bend the same effort toward safeguarding its future that it does in trying to wriggle out of trouble after it develops, future trouble will be avoided. The task is worthy of the same high level ability as the current stoppages have brought forth.

And there are the further noble motives of patriotism and peace, for our national efforts in other parts of the world are being obstructed by lack of shipping.

It has been said that a stroke of the pen can fix most world troubles. Let the mighty pen start moving.

The new P2-S1-DN1—V-2000.

Round-the-World Ships For American President Lines

BEGINNING WITH the March 1947 issue of the *Pacific Marine Review* and subsequently in May and November of 1947 elaborate descriptions were published of the V-2000 Round-the-World ships for American President Lines of San Francisco. Many months of negotiations between the company and the Maritime Commission resulted in an award for the construction of three of the proposed five ships to the New York Shipbuilding Corporation, Camden, N. J., on its bid of $10,671,000 each.

The consummation of these negotiations was brought about through the able planning and energies of George Killion, president of American President Lines, and the sympathetic cooperation of Admiral Smith and the other members of the Maritime Commission who had to devise the financing on a budget which leaves very little opportunity for the shipbuilding program.

Since the plans for the ships were first published in this magazine, numerous changes have been made in profile and superstructure as well as in the passenger accommodations. The latter have been altered to provide first class staterooms for 228 passengers against an originally planned 189. Final deck and machinery arrangement plans will come later.

The V-2000 was planned on lines somewhat between the C-3 cargo and passenger vessel and the P-2, best known at present as the *President Cleveland* type, and the ship comes up with the official designation P2-S1-DN1. George G. Sharp is the architect.

Principal Characteristics

Length—over all, about	536′—0″
Length—B. P.	500′—0″
Breadth—Molded	73′—0″
Draft—Maximum Molded	29′—6″
Depth—Molded to Upper Deck at side	49′—0″
Passengers—Floor Beds, Sofas and Upper Berths	228
Speed	19 knots, cruising
Crew	Approximately 165

Cargo Capacities (Estimated)

General Cargo Capacity	424,000 bale cu. ft.
Refrigerated Cargo Capacity	60,000 net cu. ft.
Cargo Deep Tank Capacity	48,000 net cu. ft.
Total Capacity	532,000 cu. ft.

Tank Capacities (Estimated)

Fresh Water	206 tons
Fuel oil (98% full)	2,429
Clean Salt Water Ballast	194
Total Capacity of Tanks	2,829 tons

The streamlined profile is illustrated in the artist's sketch of the ship at the beginning of this article and the interior arrangement of the stack house is shown on the accommpanying plan.

Future issues of this magazine will contain elaborate detail of passenger and cargo handling equipment. At this date only the main propulsion units such as turbines, boilers and control system have been selected and contracts for even these are still uncompleted. Commitments have been made for complete General Electric propulsion, Babcock & Wilcox boilers with Ljoungstrom air preheaters installed in the uptake of each boiler, Hagan control systems, and Worthington pumps. In this issue only the hull and machinery specifications will be discussed.

Resistance and self propelled model tests will be con-

ıcted at the David W. Taylor model basin at the ex-
ınse of the owner.

Hull Description

The ship is to be a steel cargo-passenger vessel with ırved stem and cruiser stern. There are to be three ımplete decks—upper deck, "A" deck and saloon deck -and flats at various levels. A promenade deck is to ıtend over the upper deck amidships for about one-ırd of the vessel's length and, above this, shorter offi-ırs' and navigating bridge decks.

The double bottom shall extend from the fore peak ılkhead aft to frame 179 and be subdivided into tanks ır carrying fuel oil.

Machinery is to be located amidships with four holds ırward and three aft arranged, as shown on contract ıans, for stowage of dry, refrigerated and liquid cargoes. ırgo is to be handled through hatches and side-ports ıing overhead gear and conveyors.

The ship is designed to have a total displacement of ıout 19,600 tons on a loaded draft of 29 ft. 6 in. in salt ıter, and a total deadweight of about 10,600 tons of ıhich about 7,800 tons is cargo deadweight. Construc-ın is to be under special survey of the American Bureau.

The vessel is to be built on the transverse framing ıstem, of all welded construction except shell seams ıtside of inner bottom which are to be riveted, with ıtts welded. It is provided that special care be exercised welding to avoid notch defects and discontinuities in ıain structural members or members attached to same, general thickened plates rather than doubles to be ıted where required. The architects have written into ıe specifications knowledge gained from wartime and ıstwar experience with welded ships.

Nine watertight bulkheads divide the hull into ten ıain watertight compartments. First, starting from the ıw is the conventional forepeak; then in order, holds ıo. 1, 2, 3 and 4; then the machinery space, holds 5, 6 ıd 7, and last the afterpeak. Watertight bulkheads No. and No. 2 forward are complete from the tank top to ıe upper or weather deck. Bulkheads 3, 4, 5, 6 and 7 ıe complete from tank tops to A deck. Bulkheads 8 ıd 9 extend from tank top to upper deck.

The compartments thus formed are in turn divided ıto many spaces for various uses. The fore peak houses ıe bos'n's stores, the anchor chain locker, a salt-water ıllast tank; and a room on the first flat accommodating ıe motors for two vertical capstans on the upper deck ıd the resistors for the controls of these capstans and ı the anchor windlass.

Hold No. 1

Next aft is Hold No. 1 which is 73 feet long fore and ıt and is served by two hatches through each of four ıecks: the upper or weather deck, A deck, saloon deck, ıd a flat. The weather deck hatches are fitted with ıft-off pontoon covers and on all the other decks the ıvers are metal hatchboards. The forward hatch of this ıold is 16 feet thwartships and 20'3" fore and aft. The ıter hatch is 32 feet thwartships and 17'6" fore and ıt.

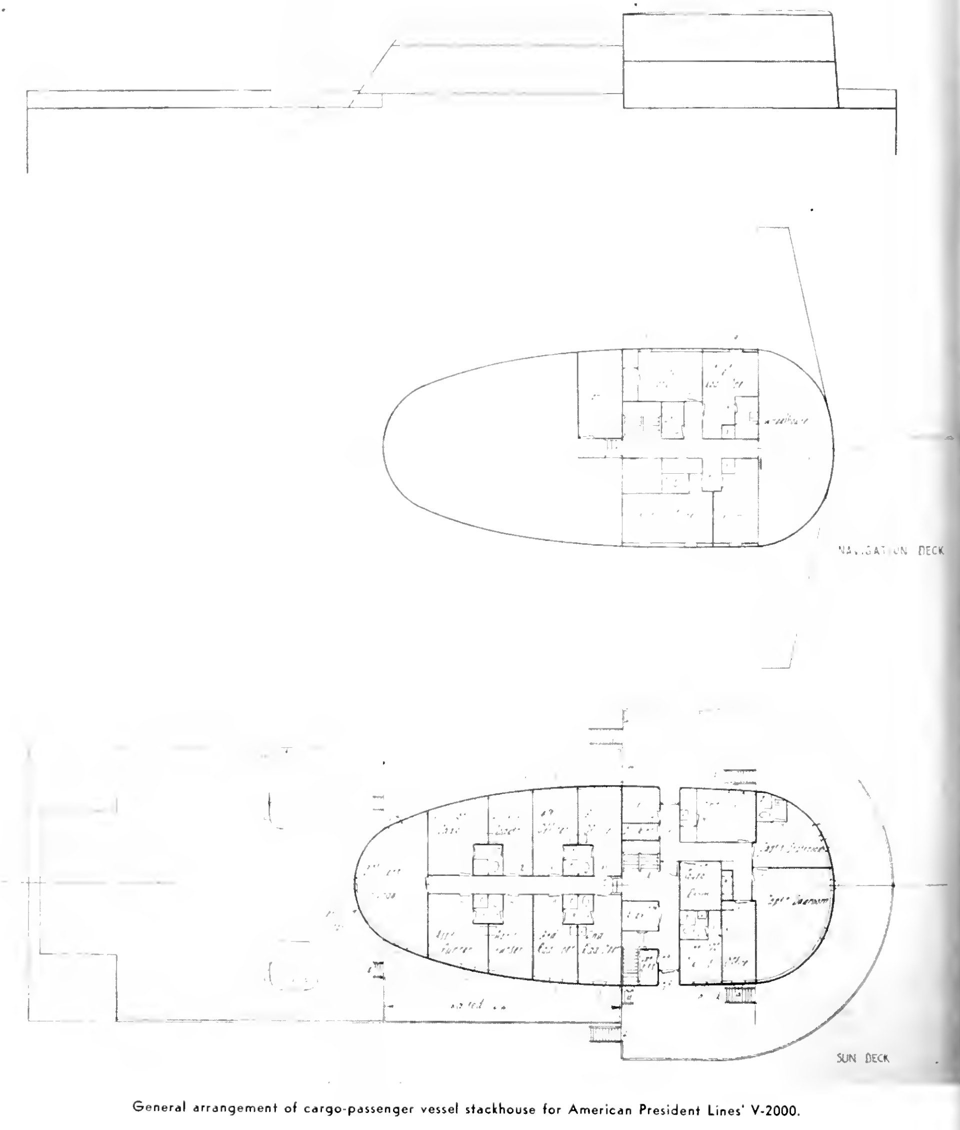
Heavy king posts are located between these hatches ıith a small deck house between the posts for catgo air conditioning equipment. Each of these posts carries a 10-ton 55-foot boom on its after side and a 5-ton 55-foot boom on its forward side. Each boom is served by a winch. The reason given for this unusual arrangement of hatches is that a much greater space on the decks can be reached spotting cargo loads off the hook than with the conventional single hatch. All the usual Maritime Commission standard equipment for cargo holds is fitted, such as connections for smoke detection tubing, connections for CO_2 fire extinguishing; ventilating ducts and outlets for cargo conditioning air; access ladders; and cargo battens. Cargo battens on this ship except where excessive cutvature of the vessel's form indicates horizontal battens will all be vertical. This type of batten fitted between frames offers better protection to the cargo and increases the cubic capacity of a hold about 1 per cent.

Hold No. 2

Hold No. 2 is 62 feet 6 inches fore and aft and is arranged and equipped similarly to No. 1 from the A

George Killion
President of American President Lines

deck level down, except that both hatches for this hold are 32 feet athwartship and 17 feet 6 inches fore and aft On the A deck level there are large compartments port and starboard for special cargo, a strongroom, and a room for cargo air conditioning machinery. The after hatch is trunked passing through a large baggage room from A deck to the upper deck. Between the hatches on the upper deck is a heavy steel mast serving as a king post and set on the centerline of the ship. Surrounding this mast is a T-shaped house enclosing lockers for deck gear, companionway to saloon deck and a room for cargo air conditioning. This house supports pads for the lower ends of four cargo booms, two 10-ton 60 feet 5 inches long, and two 5-ton 52 feet 6 inches long. In the trunked portion of the after hatch is fitted a hinged platform, with a portable rail, about 8 feet by 17 feet, that offers an excellent plan for handling heavy baggage. A four foot wide watertight door through the after bulkhead of the



General arrangement of cargo-passenger vessel stackhouse for American President Lines' V-2000.

atch trunk gives access from this platform directly into large baggage room fitted with ample racks and shelves o make baggage accessible to the passengers, an idea that vill undoubtedly find great favor with passengers on the ong Round-the-World trip with its wide variations in limate.

Hold No. 3

Hold No. 3 is a cargo hold only below the saloon deck evel. From the tank tops to the saloon deck level it is lled with cargo oil tanks which are loaded through side orts, and a 5 feet by 7 feet hatch in the saloon deck. he six cargo oil tanks will accommodate approximately 200 tons of oil. They are so designed that the interiors re entirely free of stiffeners and all corners are rounded. he design is based on former experience of American resident Lines with tank cargoes. Just aft of this pasage is the passengers' dining room, roughly 44 feet fore nd aft and 70 feet athwartships with an inset 12 feet by 5 feet taken for stairways, elevator and lockers. On A eck level this vertical division includes: seven passenger ooms; chief purser, and chief steward's room, a room or 2 stewardesses and 1 child's nurse; the barber shop, utomatic telephone exchange; music broadcast room; he passenger elevator; main staircase; pantry and various ockers. No. 3 hold is 50 feet fore and aft.

Hold No. 4—Main Galley

The main galley which prepares meals for the entire omplement of passengers and crew is all electric, and is irectly aft of the main dining room on the saloon deck nd directly over Hold No. 4 which is completely devoted dry and refrigerated galley stores. On the tank tops his space embraces a large refrigerated chamber on the ort side for fruits and vegetables; tanks for milk and for resh water amidships; and butter and eggs, ice cream nd beverage chambers and an ice-cream making comartment on the starboard side. On the 14 foot 4½ inch at are: fresh water and distilled water tanks amidships; oultry, fish, chilled and frozen vegetable rooms, staroard; and a large meat room port.

On the 22 foot 9½ inch flat are the dry stores, the hip's laundry, and the clean linen lockers. These stores re loaded through side ports and athwartship passage n A deck and brought down to the various levels by verical conveyor and elevator. They are all very convenienty arranged both for ease of stowage in loading and accesibility from the galley.

There is ample room for stowing large quantities of efrigerated foods and the space allotted to the various ategories indicates the planning of well balanced menus. he galley takes a space of 40 feet by 70 feet and is very vell arranged. From forward aft on the starboard side re arranged, the cold pantry, the bakery, and the pot nd pan scullery. Port side houses the dish and glass cullery, the butcher shop with its service refrigerator; nd the vegetable preparation room. Against the forward ulkhead is a coffee pantry, the cook's office and a silver oom. At the after bulkhead is a silver cleaning room; he conveyor and elevator system for loading and unloadng stores, and the access stairs to A deck above and the lats below.

The system of doors into the dining room is arranged or entrance from the galley only on the starboard side, and exit from the dining room only on the port side. Above the galley on A deck are the passenger entrance lobby, purser's office, purser's workroom, novelty shop and some crew accommodation.

Machinery Space

In the machinery space, which occupies 70 feet of the length, and at the saloon deck level directly aft of the galley, there are flats port and starboard with fore and aft passageways directly outboard of the machinery space casing and giving access to: the deck officers' mess, and the stewards' mess starboard; and the crew's mess and petty officers' mess port. A pantry on each side facilitates service to these messes. On this same level amidships is the engineers' shop and side ports for loading fuel oil and engine room stores. On the A deck level above this space are the fidley, engineers' stores, fan room, electricians shop and crew accommodations.

It is noteworthy that the modern plant for fueling the passengers and crew of this ship occupies approximately the same proportion of the length of the hull that formerly would have been occupied by the vessel's steam propulsion plant in the days of Scotch boilers and "up and down" engines. The modern high pressure water tube boilers and high speed reduction gear turbines of this ship are all enclosed with ample room for accessibility in a space less than one-third that occupied by the crew and passenger fueling plant mentioned above. In other words, it takes much less of the revenue cubic of a modern cargo and passenger liner to fuel 12,500 horses than it does to fuel 347 men and women. Most of the fuel for the horses is carried in the non-revenue double-bottom tanks whereas the fuel for passengers and crew occupies practically the whole of one hold.

Afterholds

On A deck over the after end of Hold No. 5 there is a thwartship passage with side ports and a pair of vertical conveyors serving the A deck level down. A 10 feet by 16 feet hatch trunked from promenade deck to A deck also serves this space. In all the handling, the cargo through side ports overhead gear will be used.

Holds No. 6 and 7 have practically the same arrangement as No. 1 and 2 forward, except that in addition to the regular 5 and 10 ton booms No. 6 has a 30 ton 70 feet boom fitted, and that No. 7 has only one hatch which is 32 feet 6 inches fore and aft and 20 feet thwartship.

The after peak at the saloon deck level houses the hydro-electric steering gear and on the A deck level takes care of the ship's brig, lamp, paint and chain lockers, engineers' and bos'n's stores and carpenter shop.

These arrangements of the principal watertight subdivisions of this design show careful planning for convenience and economy in the functions of passenger ship operation. It will be noted in the foregoing description that all commissary and refrigerated stores are located directly below the main galley and all the dining rooms, both passenger and crew, are directly contiguous to the galley fore and aft, and on the same deck level. The tankage cargo is complete in another hold subdivision. All refrigerated cargo is completely and exclusively in its own watertight hold division. The baggage room is very conveniently located and efficiently served through one of the main cargo hatches.

The C-2 after conversion.

Waterman West Coast Conversions

ONE of the most interesting mass conversion jobs yet to be undertaken in this country is that of the Waterman Steamship Corporation now in progress in five Pacific Coast yards. Waterman purchased eleven C-2 vessels and completed the conversion of one of them, the *Claiborne,* in the yard of Gulf Shipbuilding Corporation, Mobile, owned by Waterman.

During the war, Waterman's Repair Division had performed a staggering service: Fifty vessels completely armed and readied for war. Extensive repairs and alterations to 94 ships. Voyage repairs to 831 vessels. Twenty-four major conversion jobs, including two passenger liners converted to troop transports and one troop transport converted to a hospital ship.

Ten C-2 vessels were let out on competitive bid to West Coast yards and the big job is now well under way. Two of them, *Hotspur* and *John Land,* went to Todd at Seattle; two more, *Typhoon* and *Delsantos,* went to Todd at San Francisco; *War Hawk* went to Puget Sound Bridge & Dredge for conversion and to Todd for drydocking; three, *Young America, Golden City* and *Herald of the Morning,* went to Everett Pacific Shipbuilding & Dry Dock Company, Everett, Wash.; *Winged Arrow* went to Bethlehem, San Francisco; and *Dashing Wave* went to Triple A Machine Shop, San Francisco. The jobs averaged well over a half-million dollars.

The work to be performed on these vessels varies somewhat with the ship. Certain of them were in use as cargo carriers before being converted to troopers. Some were in lay-up fleets. All had Armed Guard and other defense features which had to be removed. All have now to be reconverted to cargo-passenger use, the

Waterman stack insignia on the Mobilian (ex Typhoon), one of their eleven new C-2s.

passenger facilities being the usual twelve limit. General particulars for all eleven of the completed C-2s will be

Length	459'
Beam	63' 1"
Depth	27' 6"
D. W. Tonnage	10,500
Passengers	12

Most of the ships were built at the Moore Dry Dock Company's yard at Oakland.

When their conversion is completed, Waterman will have a fleet of 55 wholly owned dry cargo ships, the largest under the American flag. In addition, the company operates a considerable number of chartered vessels owned by the Maritime Commission. In conjunction with Sudden & Christenson, Inc., Waterman operates ship services between West Coast ports and Atlantic Coast ports under the name of Arrow Line. Service between West Coast ports and North European and Mediterranean ports also has been recently inaugurated.

In addition to serving West Coast ports, Waterman vessels operate a Far East service from North Atlantic and Gulf ports; North European and Mediterranean services from North Atlantic and Gulf ports and a weekly Puerto Rican service from Gulf ports. A U. S. Atlantic-Gulf coastwise service is operated by a subsidiary corporation, the Pan-Atlantic Steamship Corporation.

Captain Norman Nicolson, President of the Waterman Steamship Corporation and many of its subsidiaries, is a native of San Francisco.

Most of these new ships will be significantly renamed,

Passenger stateroom on a Waterman freighter.

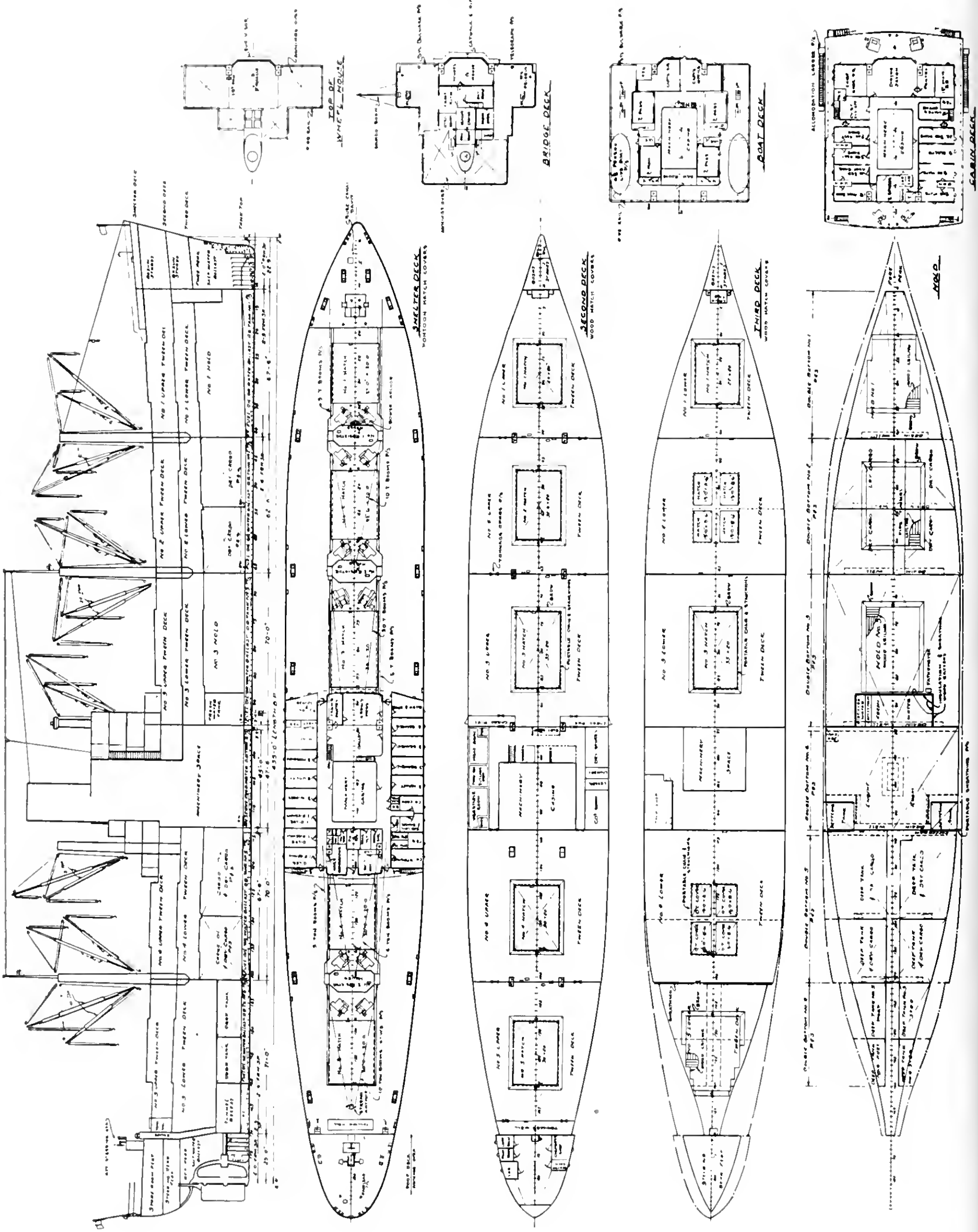
the *Claiborne* having succeeded *Cherubim*. *Claiborne* was the first American governor of Louisiana.

Hotspur becomes *Stonewall Jackson*, after the Confederate Army general.

John Land becomes *Jeff Davis*, after the President of the Confederate States.

Winged Arrow becomes *Fairhope*, a city on Mobile Bay.

Below: Waterman routes on Atlantic and Pacific.


TOP OF WHEEL HOUSE
BRIDGE DECK
BOAT DECK
CABIN DECK
SHELTER DECK
PONTOON HATCH COVERS
SECOND DECK
WOOD HATCH COVERS
THIRD DECK
WOOD HATCH COVERS
HOLD
MACHINERY SPACE

Shifting-bar caging protects two manholes and ladders in No. 5 hold. Tonnage opening (right) with shifting boards in place.

Typhoon becomes *Mobilian*, after Waterman's home port.

Dashing Wave becomes *Choctaw*, the ancient Indian tribe inhabiting the Mobile area.

Delsantos becomes *Chickasaw*, after the city of Chickasaw, Alabama.

Herald of the Morning becomes *Citrus Packer*.

Golden City, named for San Francisco, retains this name.

War Hawk, named for Southern Congressmen of the 1812 era, also retained.

Young America, named for the famed clipper ship, is

◀ Arrangement of all decks and holds of "Young America."

also retained.

These conversion jobs from troopers to commercial vessels amount to an almost complete rebuilding of the ships.

First, of course, comes the removal of defense installations, military features, wartime emergency requirements and troop accommodations. These are to be found throughout the ship, and many bulkheads, plates, doors, hatches, manholes, wiring, piping, painting and cementing have to be restored to original conditions.

The new installation of passenger quarters, extended bridge deck, new cargo compartments, new heating and ventilating and refrigerating equipment, and new cargo handling equipment on deck and in the holds, compare in cost with similar work in a new ship. The shortened time schedule allowed for these jobs indicates efficiency on the part of the shipyards.

But these major divisions of work do not tell the whole story. Everything about the ship must be examined, and every bolt and nut must be tested. Insulations and linings must be replaced, masts, kingposts, booms and cranes renewed, moved, tested and re-equipped. Piping and drainage, fire detection and extinction, life saving equipment, sanitary fixtures, hardware, salt water systems, propelling machinery, reduction gears have to be gone over, replaced or repaired and tested. Line shafting was polished.

Shifts were made in the tanks—fuel to cargo, cargo to fuel, fuel to ballast, fuel to fresh water—with added provision for liquid cargo handling.

The main turbines, General Electric 6,000 horsepower, are to be retained, but completely overhauled, as are also the emergency turbo generators and emergency generator Diesels and all electrical and navigational equipment. No provision is made for radar. The propeller is to be

Top: No. 5 Hold and Lower Hold on Typhoon converted from Troop-bunking space.

Bottom: Looking down into No. 2 Hold. Deep tanks have just been coated with vegetable oil to carry edible oil cargo.

trimmed and the rudder tested. And the Waterman W to be painted on the stack.

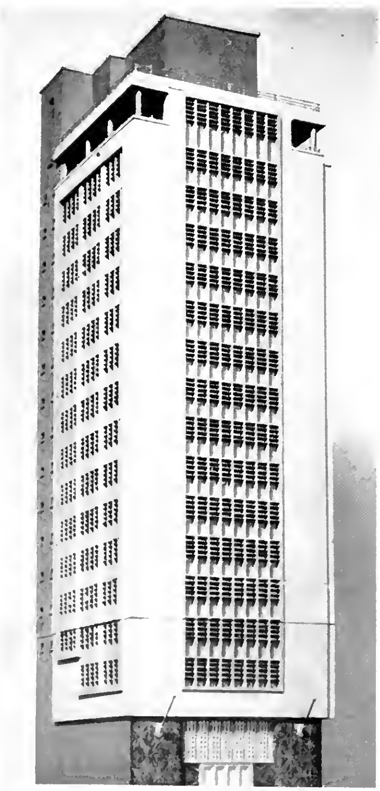
And full housekeeping equipment goes aboard to replace newly needed or missing items. It is noted that there should be three corkscrews in the inventory but there are three missing.

Waterman in the Air

As early as 1939 plans were formulated for establishing an airline to parallel the company's ship lane to Puerto Rico, thus to render a better service to the island Waterman had served for two generations. Equipment was purchased and survey flights were made in 1940. Outbreak of war prevented establishment of the air line at the time, but a skeleton organization continued to lay plans and conduct research. In addition, the company established and operated a pilot-training program for the Army.

Soon after Victory, the company acquired more planes. Waterman Airlines established a service within the State of Alabama. Later it commenced flying to additional destinations on a non-scheduled basis. This restriction of operations was necessary because the Civil Aeronautics Board had denied any American steamship companies the privilege of operating inter-state scheduled air services.

Model of Waterman Steamship Company's new office building at Mobile. When completed, this building is expected to be just about perfection in convenience, lighting and ventilation.



Four Alabamans on the Typhoon, all Waterman men, out from Mobile to handle Bay area Waterman conversion program. They are H. D. Hall, electrical inspector; J. W. Foster, hull inspector; R. L. Bean, resident engineer; and G. A. Slocum, Jr., hull inspector.

Make-Up of a C-2 Crew

Deck Department	
Captain	1
First Mate	1
Second Mate	1
Third Mate	1
Jr. Third Mate	1
Radio Operator	1
Boatswain	1
Seamen—Able Bodied	6
Seamen—Ordinary	3
Maintenance	3
	19
Engine Department	
Chief Engineer	1
First Asst. Engineer	1
Second Asst. Engineer	1
Third Asst. Engineer	1
Jr. Third Asst. Engineer	1
Electricians	2
Oilers	3
Firemen	3
Wipers	3
	16
Steward's Department	
Chief Steward	1
Chief Cook	1
Baker	1
Second Cook	1
Messmen	3
Utility Men	4
	11
Full Crew	46

The Fishery Exploration and Hydrographic Vessel

"Spencer F. Baird"

By H. C. HANSON

IN THE CONVERSION of LT (Large Tug) 581 to the Fishery Exploration Research and Hydrographic Vessel *Spencer F. Baird*, work was commenced at Sausalito in December 1946 and completed in San Francisco July 1947. Oceanographic and biological studies and experimental fishing operations are being conducted with this vessel to provide basic information on the fishery resources of the Philippines and also to test methods of fishing which can be adopted by the Fisheries of that region as well as our Fisheries as a whole. A brief article about this vessel was published in the Pacific Marine Review recently.

The *Spencer F. Baird* is an all welded steel vessel with raised forecastle deck, steel main and boat deck houses

LT 581 before conversion.

and pilot house. The overall length is 143′ 5″, breadth 33′ and a depth of 17′, draft 11′6″ forward and 14′ aft, Diesel powered with 2,950 HP, 12 cyl. Veetype General Motors Diesels, turning 750 RPMs, driving electric motors, through reduction gears to a single shaft propeller motor, turning a propeller 9′6″ diameter with 7′4″ pitch, at 160 RPMs, which allows great flexibility of operation. This was one of the desirable features in selection of the vessel since bare headway at times would be important. Normally the vessel's free speed was 11.5 knots.

One 60 KW and one 30 KW generator were in the original installation. The 30 KW was removed and replaced by a duplicate 60 KW set. The switchboard was increased in area by 25% to take care of additional circuits for pumps, compressors, evaporator, and other new equipment.

Changes and additions were made as follows:

The steering gear was all above deck. This was removed, rudder stock shortened and quadrant placed below deck in lazaret, and chain led through pipe fairleads to steering engine in aft engine room. The afterdeck was cleared of all bitts and other obstructions, the hatch was moved forward as far as possible in the limited cargo hold to permit of carrying large combination bait and cargo tanks and brine tank. The towing winch and power capstan were removed from deck house, so the enclosure could be used as a laboratory room. The derrick mast was removed and a heavy duty main mast installed with 5-ton boom, gear and stays, as per photograph. The boat deck was extended outboard to ship's side to provide more deck space on boat deck and create a shelter at the same time over main deck. The wheelhouse was extended to provide added space for the captain and chief scientist.

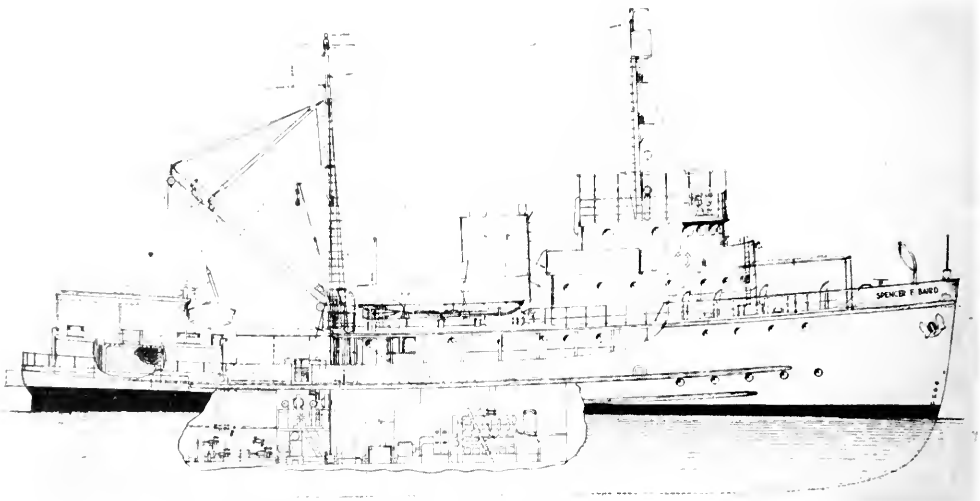
The largest single item in the conversion was to build the bait, brine and cargo tank, which cost alone about $50,000. It was a rather complicated structure consisting of five tanks. The two bait and cargo tanks were 6200 gallons and 5000 gallons respectively; the after brine tank of 2550 gallons, the two side brine tanks of 1550 gallons each. These were made of welded steel with plyboard sheathing.

In light of the fact that very little information has been published relative to the detail specifications of the bait tanks on tuna vessels, it is felt that a detailed descripiton of the building and operation of this tank would be beneficial to the reader and possibly to the fishing industry.

The bait tank, cargo and brine tank were all-welded steel with 1/4″ and 3/16″ shell and bulkheads, with 4″ x

LT 581 converted to Spencer F. Baird.

This paper presented in expanded form to the Society of Naval Architects & Marine Engineers, Pacific Northwest Section, at Gearhart, Ore.

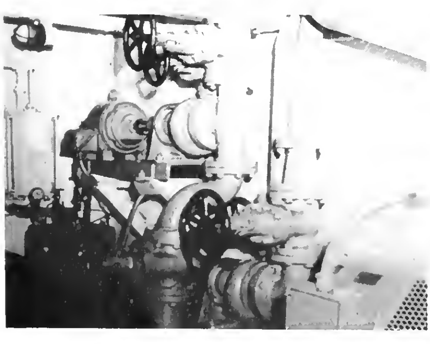


Outboard profile with sectional cutaway showing machinery arrangement.

3″ x ¼″ stiffeners, having cork insulation, 4″ thick all around and between the tanks, with ½″ plyboard all over the exteriors, (plyboard being used to keep fishermen from damaging their hooks, and for the added reason of cutting down the transfer of heat). The hatches built over each tank were 3′ x 4′ x24″ deep for large tanks, with 2 feet square hatches over smaller side brine tanks. All these were fitted with top hatch covers of 1″ plyboard, with a lower insulating cover or cold stop in two sections. These were built of plyboard with 3″ of cork between.

The bait and cargo tanks had 4″ x 6″ inflow or supply lines which were led into the top after corner of each tank. In each supply corner a rectangular segment was welded in the full depth of tank with a perforated screen full depth of tank to break the water stream down to avoid damage to the bait. This strainer is so arranged that water will be directed into tank so as to create a circular motion of the water. The overflow is to opposite corner of the tank and heretofore had been laid out to the exact design as the inflow pipe and to same area. This has been found to be insufficient in area and bait was carried against the outlet screen plugging the screen and the fish died because of the pressure of the overflow. In this case we made the screen ten times the area of the discharge opening, the discharge or overflow duct divided in half by 2¾″ x 11½″ weir boards fitted to a height of about 18 inches into hatches previously described. Hatches of about 24″ x 16″ were built over the overflow pipe to the height of the hatches at the center of the tank, which is approximately 24″, the water then flowing over the weir boards down to deck level through opening in side of tank, then overboard to shipside through 6″ x 8″ to 4″ x 6″ sized discharge pipe through bulwarks.

Brine pumps in alley bait pump fore.



The tanks were painted with white plastic paint. To further give light into the bait wells a new type flood light was made and fitted into fore and aft side of hatches at deck of tank. So that flood light would throw full 200 watts of light into tanks, a 10″ fixed deck light was fitted into side of hatch coaming with a welded steel casing containing two 100 watt fixtures inside; the fixed light was waterproof, with back removable for access.

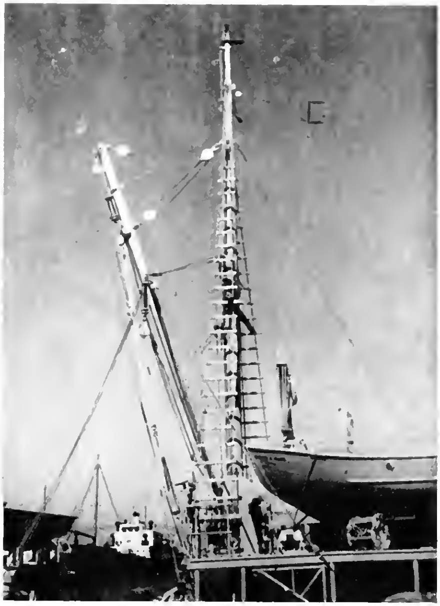
The tanks were refrigerated throughout including the brine tanks; the small tanks port and starboard carried 360 ft. and the aft brine tank 484 ft. of 1¼″ galvanized pipe coils. The largest bait tank carried 906 ft. and the aft bait tank carried 696 ft. of coils on 4½″ centers. No coils were placed in the hatches because of the insulating cover at the bottom. In the bait tanks, only, ¼″ galvanized wire mesh screen screwed on ⅛″ x 1¼″ flat bar frames set up in portable sections was fitted over the pipe coils to keep the bait from becoming tangled and

lodged back of the coils. The above refrigeration piping was sufficient to maintain a temperature of 20 degrees in the 90 to 100 degree outside temperature of the Philippines. Thermometers were provided for observing the temperatures mechanically and by recording dials outside and above the tanks as well.

The brine tanks were fitted with 3″ pipe supply lines led into top of tank and arranged to fill at the bottom also; this was for experimental work when freezing. For observations as to whether freezing could be accomplished more readily by top agitation, or bottom, or both, 1½″ drain valves were fitted at the bottom of each tank, as no means were provided for pumping these tanks out, relying on gravity for drainage. Small separate 1¼″ agitator pumps were also piped and insulated, and arranged to create proper agitation for freezing.

Provision was made for aeriation of the bait tanks by installing air lines to the bait water supply lines, again for the purpose of experimenting with bait preservation by aeriation.

The bait pump used was 8″ suction and 6″ discharge Pacific Centrifugal Pump Model LDM turning 1750 RPMs, 1400 GMS at 20 ft. head and driven with 20 HP motor. This pump filled the large 6200 gallon tank in 6½ minutes, and the 4000 gallon tank in 6 minutes. The 3″ brine pumps were connected to the brine tanks and this filled the aft brine tank with 2550 gal. in 9 minutes and the side brine tanks, totaling 3100 gallons in 7 minues. These pumps were also Pacific Centrifugal Pump Model LDM turning 1800 RPMs, 300 GPMS at 20 ft. head and driven with 3 HP motor. One extra pump was used as a spare and bypass was installed to use either pump when needed, for agitation or supply. The picture shows this installation.



Mast and special rigging.

Deep Water Navy Fathometer.

As a matter of interest when each tank was filled, the change in trim was measured and it was found that when aft CL Brine tank was filled the change in trim was 8″. The side tanks were filled next and a change of 7″ in trim was noted. The smallest bait tank was filled next and there was a change of 9″ trim, and the largest tank was filled last and the change of trim was 13″ additional, leaving the fishing platforms 2″ above the water as designed and shown on the profile plans. With the foregoing data on capacities and filling times, it is hoped that pertinent comparative design data is provided for future designs in tuna vessels.

It will be noted that the fishing platforms were designed several feet below the sheer line and not at the deck sheer as on the ordinary tuna vessel. This was due to the fact that insufficient weights could be placed aboard the vessel due to lack of cargo space. Because of the placement of the platforms, the bulwarks had to be cut down to provide a fair working height for throwing the fish onto the deck. This was satisfactory for this type vessel when steady commercial fishing was not contemplated. Bait basins with circulating water were provided for each fisherman and agitation spray water pipe was fitted into the outer platform frame, the pipes connected by means of rubber hose between the frames. The platforms were fitted all around the stern on this vessel rather than on one side only as on the ordinary tuna clipper. The pictures give the detail arrangement of the platforms

(Please turn to page 79)

BRITAIN'S MERCHANT NAVY

By MARTIN CHISHOLM

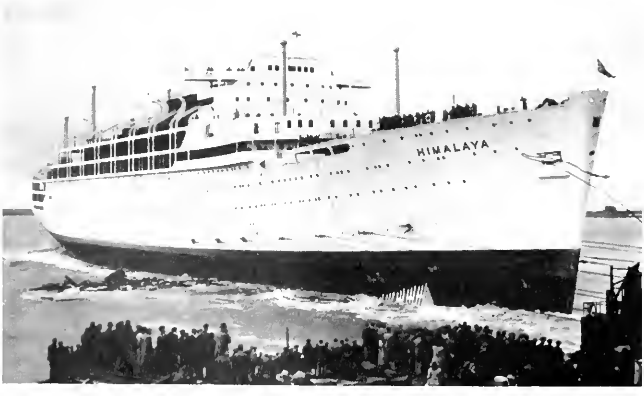
British Naval and Shipping Correspondent

ONE of the most important tasks of postwar reconstruction with which Britain is faced is the task of building up the Merchant Navy to enable it to meet the country's needs for sea transport and to allow it to play its full part as a world carrier. When World War II broke out in 1939 the merchant fleet of the United Kingdom totaled 16,900,000 gross tons. This figure included dry-cargo ships and tankers of 500 gross tons and over. It constituted over 27 per cent of the whole merchant tonnage of the world. Losses during World War II amounted to the immense figure of eleven million tons, a figure which was almost as great as the shipping losses of all the other allied countries put together. With these losses and other factors combined, the United Kingdom was left in August, 1945, with a Merchant Navy that totaled only some 12,800,000 gross tons, and this in spite of vast wartime shipping construction.

The figures for June of this year give some indication of the magnificent effort that has been made by shipowners and shipbuilders alike to rebuild the merchant fleet, for by the middle of 1948 our total tonnage was already back to some 15,750,000 gross tons; that is to say, we were more than half-way along the road to our prewar tonnage figure. That is the over-all picture of Britain's shipping position in terms of tonnage figures, but these figures alone cannot possibly give the picture in full, for the simple reason that they do not take into account the age and condition of many of the existing vessels which must be replaced before long by new ships of modern design to enable her to take once again her full place as a carrier by sea.

Reconversion Work

Simultaneously with the work of building new tonnage, both for the British and for foreign flags, United Kingdom shipyards are pressing ahead with the work of reconverting for peacetime uses the passenger and passenger-cargo liners which were employed as troopships during the years of World War II. This reconversion work, which was begun in the spring of 1946 with the release of the liner *Queen Elizabeth* from Government service, should be completed by the autumn of next year. Seventy vessels totaling a little over 1,250,000 tons will be dealt with altogether under this reconversion program. This figure, however, cannot give anything like a complete idea of the reconversion problem because practically every ship that came through World War II stood in need of repair work or maintenance which had had to be deferred during her years of war service. The changes which had hurriedly to be made in ships to fit them for the needs of war were, perhaps, most spectacular in the case of ships to be used for troop-carrying



Photos courtesy of British Information Services

BRITISH YARD LAUNCHES BIGGEST SHIP OF YEAR

The largest vessel in the world to be launched this year, the 31,000-ton P&O passenger liner Himalaya went down the slipway at Messrs. Vickers-Armstrong Yards, Barrow-in-furness, after the launching ceremony had been performed by Lady Currie, wife of the P&O chairman. The vessel will carry 1780 passengers and crew, and will go into service on the express run to Bombay and Australia, cutting the service schedule from England to Melbourne from 38 to 28 days. She will have a raked stem and cruiser stern, with one streamlined funnel and a single pole mast. The picture shows the Himalaya entering the water.

which, in many instances, had to undergo a complete internal transformation. But the majority of other vessels had to undergo modifications and changes of one sort and another to enable them to carry the necessary defensive armament. Many of these modifications have had to be altered once again with the return to peacetime trading, and figures given in the last annual report of the Chamber of Shipping of the United Kingdom show that, in all, reconditioning settlements will probably be negotiated for between 1,300 and 1,400 vessels. These settlements will involve financial contributions by the Government totaling somewhere in the neighborhood of £15,000,000 ($60,000,000).

Turning for a moment to current shipbuilding one finds that, according to figures published by Lloyd's Register, there were on the stocks in June of this year 457 merchant ships totaling 2,243,703 gross tons in yards in Britain and Northern Ireland. Two hundred and seventy-nine of these ships are destined for the British registry.

The transition from war to peacetime running has involved considerable changes in the organizational side of the industry. The problem has been to find a means of relaxing the tight Governmental control of shipping which was essential in World War II and at the same time ensuring that the necessary tonnage is available to handle goods in accordance with the Government's import and export policy. It has not been found practicable at this stage to restore to the ship-owning companies complete freedom from control, but an agreement has been worked out between Britain's Minister of Transport (Mr. Alfred Barnes) and the General Council of British Shipping, and is now in operation.

Under this agreement the shipowners are responsible for arranging among themselves that, within the limit of British shipping resources, the necessary tonnage is made available for meeting the needs of the Government's export and import plans. To give effect to this agreement the executive duties which are involved in the necessary distribution of tonnage have been transferred from the Ministry of Transport to a body established by the shipping industry and working under the control of the industry's Shipping Advisory and Allocation committee. This committee has under it two standing committees, one handling liners and the other dealing with tramp shipping. From this it might appear that British shipping has now been decontrolled and its handling passed back entirely into the hands of the shipowners. This is not in fact the case because all voyages are subject to obtaining the necessary licenses. Moreover, the Minister of Transport still has powers to direct ships into particular trades and he remains responsible to Parliament for the fulfillment of the Government shipping programs. In a number of trades, too, control of freight rates is still in the hands of the Ministry of Transport.

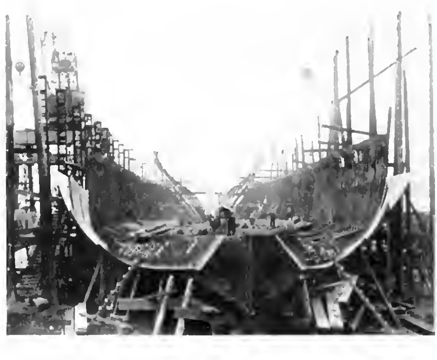
Seafaring Becomes a Profession

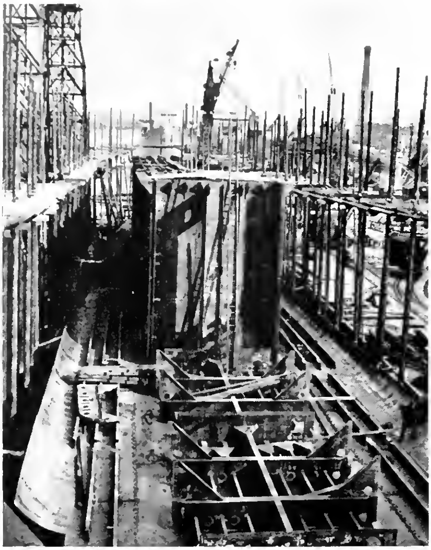
World War II, in which British shipping suffered so severely, brought about striking changes in the economic position of British merchant seamen. From a casual affair in which the seaman had to rely from voyage to voyage on getting a ship, seafaring has been changed into a profession which offers a degree of security that the sailor has never before known. The change was set on foot as far back as 1941 when a Government order was issued regulating both the freedom of an employer of seamen to discharge his employees and the freedom of seamen to leave their ships. Side by side with this wartime restriction, provision was made for continuity of employment for seamen, leave on pay and the payment of wages while awaiting a ship. This measure, dictated by the needs of war, has now been expanded into a scheme administered by representatives of shipowners, with the advice of representatives of both officers and men, under which seamen can enter into two-year contracts either for general service at sea or with a particular shipping company. Where a seaman signs a general service contract he is liable to be assigned to any ship, belonging to any company, which is requiring a crew. If the contract is signed with a particular company the seaman remains continually employed by that company alone. Men who sign these contracts are classified as "established seafarers" and during the intervals between voyages, they receive in addition to normal unemployment benefit a special supplementary allowance. Certain qualifications are necessary before a seaman is eligible to rank as an "established seafarer"; these include at least 12 months' sea service. The approximate total of Merchant Navy manpower is now in the region of 138,000 men, and it is hoped that of these as many as 70 per cent who are eligible as "established seafarers" will sign these service contracts. By the middle of this year nearly 50,000 contracts had been taken up.

In general Britain's Merchant Navy is not experienc-

Picture shows: Framework of ship for the Norwegian fleet takes shape on the slipways of a British shipbuilding company.

Six whalecatchers and three cargo vessels are being constructed by an English shipbuilding company for Norwegian shipping firms. World shortage of oils and fats is causing a great demand for whalers, and a number have also been built for Britain's whaling industry.





TANKERS

An oil tanker under construction. The center bulkheads are being erected on the bottom of the ship. Longitudinal bulkheads run the full length of the cargo space and are crossed by transverse bulkheads, thus dividing the ship into a series of tanks. This system greatly strengthens the ship, and breaks up the movement of oil from side to side, which otherwise would cause dangerous instability in bad weather. The individual tanks enable different types of oil to be carried. The engines are generally aft and for safety are separated from the tanks by double bulkheads known as coffer dams. Small expansion tanks allow for the expansion of the oil at high temperatures. The first ocean going tanker was built in Britain on the Tyne in 1886.

ing any shortage of men, although there is still some shortage in engineer officers and junior navigation officers and also in fully qualified deck ratings. At the end of World War II a Release Scheme came into operation and, as was to be expected, many men who had served throughout the war left the Service. In the first half of 1947 the total number serving (excluding Asiatic seamen) fell to about 117,000. Over the last 12 months, however, there has been a steady increase, and many men who left the Merchant Navy under the Release Scheme are now back at sea again.

The question of the welfare of merchant seamen is receiving particular attention in a number of directions. One notable step is to be found in the tendency towards a greatly improved standard of crew accommodation, particularly in deep-sea ships built during and since World War II. These improvements include such items as improved ventilating, heating and lighting systems, and in many cases the provision of single or two-berth cabins for members of the crew. All deep-sea ships built during and since World War II have been fitted with refrigeration, mess rooms and improved galleys and there have been many improvements in the furnishings of the crews' quarters, in washing arrangements and similar amenities.

Investigations By Experts

An essential part of bringing the Merchant Navy to its full peacetime efficiency lies in speeding up the turn-round of ships in port and, in order to investigate this problem, a Working Party has been established to examine the situation at various ports and to suggest means of further improvement. Teams of experts have already carried out investigations at London, Liverpool, Hull, at the northeast coast ports, in the Bristol Channel, in the West of Britain and on the rivers Clyde and Forth in Scotland. Many of Britain's ports and docks suffered under bombardment during World War II. Here are a few facts and figures giving a general glimpse of a few of the main dock areas. London itself has five dock systems, administered under the general control of the Port of London Authority. These are the Tilbury Dock, the Royal Docks, the India and Milwall, the Surrey Docks and the London and St. Catherine's Docks. In addition there is the passenger landing pier at Tilbury. The Royal Docks, which comprises the Albert, the Victoria and the King George the Fifth Dock cover between them 237 acres of water and are reputed to form the largest enclosed dock area in the world. It is worth recalling that the largest ship ever to berth in the London River was the *Mauretania* which berthed in the King George the Fifth Dock on her maiden voyage in 1939. The total water area enclosed in the London Docks is 712 acres and the Docks have 44 miles of quays. One of the chief postwar problems of the London dock area is the reconstruction of storage sheds and the like which were badly damaged during the blitz. New floating cranes and three-ton electric cranes on the quays have recently been installed. The main cargoes handled in London are meat, wool, timber, grain and wines.

An interesting harbor innovation has been made recently in Liverpool with the installation of a radar system for bringing ships up the Mersey in thick weather. The dock system at this port consists of a series of comparatively small docks covering a total water area of 459 acres with 28 miles of quays.

Southampton, on Britain's south coast, in addition to providing deepwater quays for the largest passenger liners and a drydock large enough to take any vessel afloat, has fine bunkering facilities with a coal dock capable of floating 2,000 tons of bunker coal at one time. Its chief imports include coffee, cocoa, wine, tobacco and all kinds of foreign and colonial produce.

The chief center of coal export is Cardiff with other South Wales ports. On the River Clyde, Glasgow has 371 acres of dock water, while, on the Humber, Hull provides 200 acres of docks with 12 miles of quays from which a large export is carried on in coal, coke, grain, iron, steel and vegetable oils.

The Effect of Welding On Dimensional Changes in Steel

By LEON C. BIBBER

Welding Engineer, Carnegie-Illinois Steel Corporation

RIVETING, bolting, and other mechanical connections in general do not change the length, the thickness, the physical properties, and other characteristics of the steel they join, with the exception of possibly a slight hardening as the result of the cold working and local bulging caused by riveting. Welding, torch cutting, and other thermal processes, on the other hand, can markedly change the length, width, thickness, hardness, tensile strength, yield point, microstructure, and state of stress of the base metal.

The lengthwise shortening as a result of complete heating of structural members is known to anglesmiths and those who are directly involved in the hot forming of plates and shapes, but is probably not widely known outside of that small circle. Possibly the reason why knowledge of this fact has not been wide-spread is that the heating and forming are the first operations done, and the parts are laid off after the shortening has taken place. However, if for any reason a part had to be heated after it had been cut to length, the shortening would be at once apparent.

If a flat plate were to be torch cut along a line, the heating during cutting would cause the main body of the plate and the edge of the strip to expand. When cool, the plate would be found to have shortened on both sides of the torch kerf. Since the heating was local, shortening would occur in the immediate vicinity of the kerf and would not occur where heat had not been applied and the result would be a permanent warp. (See Figure B.)

Warping as the result of torch cutting ordinary structural steels is inevitable. In most instances, particularly in the case of short cuts, the warping which does occur may be so small as to be of no consequence, but the warping is there and precise measurements would disclose it.

Thus far we have dealt only with the effects of heat as such and not with the effects of welding. Let us now consider the effect of the latter. We do not have weld metal alone in actual practice; we have welded joints involving both weld metal and the base metal.

Let us consider the mechanism by which shrinkages are brought about. It will be apparent that the act of depositing a weld is one of progressive spot heating, with temperatures raised above the melting point. The heating medium, namely the arc, creates an intensely concentrated heat, resulting in very steep temperature gradients. The resistance to expansion is obtained from the cold metal all about the arc. The plate is not severed as in the case of cutting, and the forces are resisted in all directions. The upset occurs as a continuous ridge. While the shrinkage characteristics of weld metal itself are very similar to those of base metal, the raised bead is not in a favorable position to exert forces on the plate except in a longitudinal direction, and the added metal may contribute very little to the total shrinkage.

Lest anyone be inclined to consider that the unit shrinkages in terms of fractions of thousandths of inches are negligible, it should be pointed out that the values amount to total shrinkages ranging from 0.45 inch to 0.93 inch per 100 feet,—very appreciable amounts.

In a large welded joint there are metals having many different physical properties and many different states of stress. Weld metal is in general stronger than virgin base metal and has a higher yield point. Its elastic behavior, however, is very similar to that of base metal. Immediately adjacent to the weld metal the base metal has been hardened and strengthened by the heat of welding. Tests have shown that this heat-affected base metal has higher physical properties than even the weld metal. At varying distances from the weld the temperature of the base metal has been raised varying degrees above the lower critical temperature, and the heat-affected base metal at different points will have properties intermediate between those of the strong heat-affected base metal and the unaffected base metal. At two points only, where the residual stress changes from tension to compression, will the base metal be stress-free. The base metal outside of those points will be subjected to residual compression. The weld metal and heat-affected zones will be in residual tension. (See Figure C.)

Since welding causes shrinking to a greater degree than any of the thermal fabrication processes, and since warping is the result of shrinking in one location and not in another, it follows that welding is a very bad offender as regards warping.

In a very large completely welded structure, such as a ship, in which there are hundreds of longitudinal and transverse joints, the total shrinkage resulting from

welding is astounding. If a 100 ft. ship were completely tacked together and then welded, the total shrinkage would be about 8 inches, that is, about 2 inches per 100 feet. Not only would the ship have shortened, but she would be badly distorted. In erecting large plate structures, of which ships are a good example, the shrinkage can be constantly corrected and allowed for as the work proceeds. Joint openings can be increased, large sub-assemblies used, and many other measures taken. In the case of ships, special erection procedures have been used with such success that the bow and stern were actually slightly depressed.

Before we leave the subject of residual stress, one more point must be mentioned; namely, stress locked-up during the act of welding. It was pointed out previously that the maximum residual stress in completed joints was in the longitudinal direction. This will be true if the plates are relatively free to move during welding. If, however, they had been prevented from moving toward each other by external restraint, very dangerous transverse stresses could have resulted. This situation can be intensified by the notch effect of the unfinished weld. Cracking of the earlier beads of weld metal can occur, and the cracking may not be noticed by the welder and subsequent beads of welding deposited over the crack. Under the shrinkage stress of the cooling weld metal, the crack may progress further into the weld. Two practical remedies for this situation are at hand; the first, to prohibit the welding of joints unless at least one member is free to move, however difficult it may be to arrange in a complicated structure, and second, to refrain from permitting a joint to cool until the welding has been completed. Obviously the stress situation resulting from external restraint is quite dissimilar to that of local tension balanced by broad zones of compression.

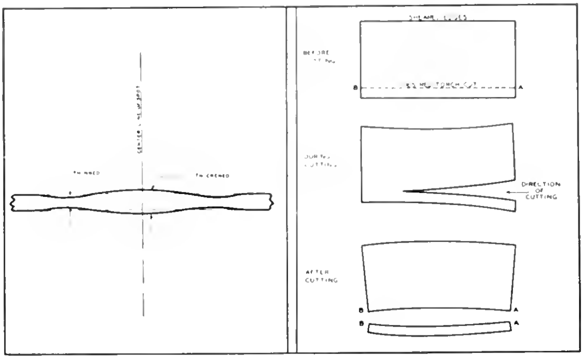
The big question raised by all the previous discussion is whether local residual stresses are dangerous. Local plastic flow is the factor which dissipates localized stress. If under certain conditions local plastic flow is prevented from obtaining in sufficient degree, then the situation can become critical. Low temperature can adversely affect the ability of a material to flow plastically and in all designs operating at low temperatures, whether natural or artificial, consideration must be given to this factor.

In every case of failure in a welded structure, a stress raiser has been present. The most usual stress raiser is a notch. That notch can be either internal or external. Notches can exist in a structure as a result of design. Examples of such notches are re-entrant angles, square-cornered holes, fillet-welded connections, and the abrupt stopping of parts on a highly stressed member without providing opportunity for smooth transition of stress. Notches can also exist as a result of workmanship. Examples of this kind are flaws in weld metal and undercutting at the toes of filler welds. The control of the dangerous stress raiser, namely, the notch, is wholly within the hands of the fabricator, both from the standpoint of design and workmanship.

It would appear, therefore, that residual stress which exists in rolled beams, flanged, joggled, bent, and other cold worked parts, as well as in torch cut members, locally heated parts and welded structures need not be feared per se; it is stress whether residual or otherwise augmented by stress raisers in the form of notches that can under a certain combination of factors become critical.

The most usual and successful method of minimizing the locked-up stresses resulting from cold forming, local heating, welding, or any other process is stress-relief annealing. Stress-relief annealing is the process of lowering the residual stress level by heating the structure in a furnace to a temperature below the lower critical point and then allowing the weldment to cool slowly in the furnace. By heating, the yield strength is lowered until it has a negligible value of but a few thousand pounds per square inch. When the yield strength of the material is thus depressed and one part of the structure is pulling on another, plastic flow takes place. The temperature is kept below the lower critical point so that the transformations described earlier will not take place. When the heating has been completed, a very important part of the process is the slow cooling to follow. For parts of moderate size, permitting the furnace to cool down by itself is generally satisfactory. However, in the case of specially large structures, controlled cooling is carried

Arrangements for determining shortening due to longitudinal w



Left: Thinning of spot-heated plate due to shrinkage stresses.

Right: Effect of torch cutting on flat plate.

out and sometimes several days elapse in the process.

Two interrelated objectives are achieved by stress-relief annealing: (1) the residual stresses in the part are minimized; and (2) a considerable degree of tempering is obtained whereby the ductility of the structure is increased. Sometimes the former is the primary object, as in the case where precise machining operations must be subsequently carried out and ductility is of little importance. In other cases dimensional stability is of little concern, but ability to endure distortion and abuse is paramount. However, as was pointed out above, one end is not achieved without accomplishing the other.

The decision as to whether or not a part should be stress-relief annealed is a difficult one, and generally speaking there is no guidance but experience. In the case of structures too large to put into furnaces, such as ships, buildings, etc., the problem then becomes one of deciding whether to weld. A great volume of general experience has been building up over the years, so that reasonably satisfactory decisions can be made in practically all cases.

As has been pointed out previously, the welding operation consists of progressively melting a small amount of metal. This small globule of molten steel is not very remote from the large mass of cold base metal of the structure. The effect of this gradient is that of a rather drastic quench and as a result, the steel which has been heated to temperatures above the critical range may be hardened. If the base metal is a normal structural steel, the resulting hardness attains a nominal value and no harm results. Hardness is a good indicator of strength and the hardened metal could readily be strong enough to develop the high longitudinal residual stresses described previously.

However, if the base metal were a material of high hardenability and one of considerable carbon, martensitic hardening could result in cracking. The cracks known as underbead cracks occur in the base metal and not in the weld metal, and are due to the fact that stress is present and that the quenched metal is incapable of flowing to relieve the stress. Such steel is not amenable to welding without special procedures.

Since the hardness described above results from the heat abstracting capacity in the large cold mass of base metal, then the prevention of this undesirable hardness lies in taking away from the steel base its heat extracting capacity; or as the process is commonly known, preheating. It is most surprising how effective are small increases in temperature in preventing ill effects. For example, steel lying in the sun on a hot summer day is adequately preheated for many purposes. Steel heated by means of hot water or steam to temperatures of 200-212°F. is adequately preheated for other purposes. A temperature of 350° F. is amply sufficient for almost any structural purpose. However, when preheating is done, a means of measuring the temperature involved must be provided. Merely guessing at a temperature is not satisfactory, because an improperly low temperature may be obtained or costly gases may be used wastefully in obtaining unnecessary temperatures. It should be emphasized, however, that preheating is generally not necessary for the ordinary structural steels, but is used to prevent zones of low ductility in steels of greater hardenability.

Quick Job on the Lurline

In only twelve hours of actual elapsed time, the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division, recently completed drydocking, cleaning and painting of the entire underwater body of the hull of Matson Navigation Company's luxury liner *Lurline*. A job of this nature would ordinarily require more than two working days.

In addition to this, they lifted the ship's port high pressure turbine casing, inspected the turbine rotor, and reinstalled and rejointed the turbine casing—all in approximately 24 hours.

When the "Mormacgulf" arrived in Los Angeles recently, riggers and machinists were ready to take out the worn gear. This picture shows the first step of that job—removal of the generator gear housing.

Hobbing Machine Supervisor Baker examines the worn gear while it is suspended from a crane on arrival at Sunnyvale.

Speedy Repair Service ▶

AS SHIPOWNERS KNOW WELL, one of the biggest problems of marine maintenance is the replacement of important parts without tying up the ship. Such a problem was recently faced by Moore-McCormack Line, Inc., operators of the S. S. *Mormacgulf*. Northward-bound between the Canal Zone and Los Angeles, this ship developed an unusual noise in the engine-room. It was caused by the increasingly rough operation of a gear and pinion in one of the ship's generator sets, resulting from years of hard service which included intensive wartime operation. It was apparent that it would just be a question of time until the gear went out completely.

The ship can function satisfactorily for a limited time on two of its three generators, so it was decided to have the pinion re-hobbed at the Westinghouse plant in Sunnyvale, near San Francisco. The ship was scheduled to continue to Vancouver, B. C., and return, and because of short availability in San Francisco, it was necessary to remove the gear and its pinion in Los Angeles.

The accompanying pictures show how the gear was removed, taken to Sunnyvale for re-hobbing, and then put back into operation, without any loss of the ship's valuable operating time.

From Oil to Coal

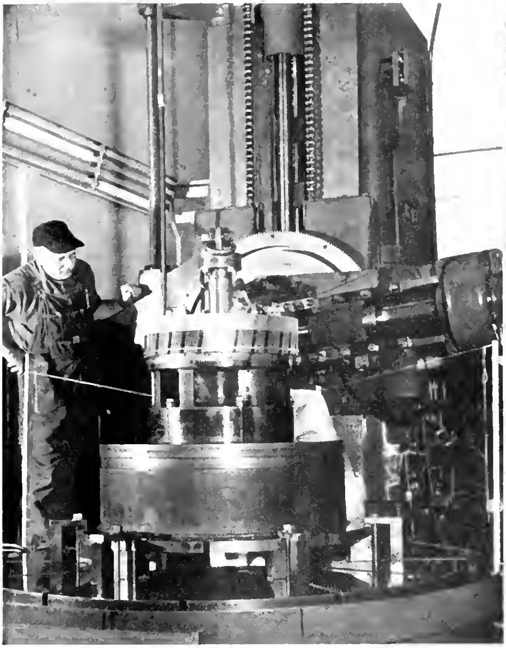
From oil-fueled victory ship to coal-fired collier is the change which the S.S. *Oakey L. Alexander* underwent at the Newport News Shipbuilding & Dry Dock Company preparatory to her first voyage from the yard October 26 as a part of the Pocahontas Steamship Company's Atlantic Coast coal carrying fleet. The ship is powered with two B & W boilers equipped with spreader stokers.

The S.S. *Oakey L. Alexander*, formerly the S.S. *Laconia Victory*, is the first modern American ocean going vessel to be converted from oil to coal. The change was made because the Pocahontas Steamship Company, owner of the ship, found that it would be more economical to operate with coal than with oil.

The ship bears the name of the president of the steamship company and is the second company ship to be so designated. The original S.S. *Oakey L. Alexander*, a smaller collier, was lost in a storm in March 1947 enroute from Norfolk, Va., to Portland, Me.

In addition to the change in boilers, extensive alterations were made in the vessel to convert it to a collier.

The boilers which were installed in the S.S. *Oakey L. Alexander* are sectional header, single pass boilers, each of which has a normal capacity of 27,500 lbs. of steam per hour.

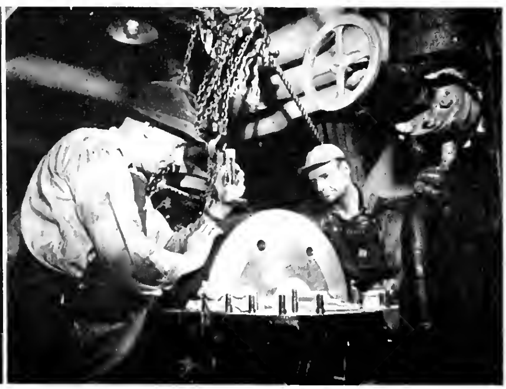


The hobbing machine goes to work. Once the complex mechanism is started, careful watch is kept to make sure that the hob cuts the exact tooth-form. Machinist H. C. Brown has to observe tolerances as close as .0003 of an inch for the resurfacing of this worn marine generator gear. The massive apparatus is enclosed in a room which maintains constant temperature.

When the "Mormacgulf" returned from Vancouver, B. C., two weeks later, the re-hobbed gear and pinion were waiting for her at dockside in San Francisco. As soon as the gear boxes were slung aboard, they were uncrated and then carefully lowered into the ship's engine room two decks below. In this picture, Westinghouse supervising field engineer, G. C. Hutchings, gives the gear a preliminary examination as soon as it arrives in the engine room.

This gear weighs 900 pounds and it's a tough job to swing it into place without damage, in the confined engine-room space. Furthermore, it must be positioned with as much accuracy as if it were the jewelled shaft of a fine watch. Machinist crew chief Hans Arfsten, right, and machinist R. Reynolds, left, slowly lower the gear into its bearings.

Crew Chief Arfsten makes sure all the teeth are OK, while rigger Caesar A. Tello helps him turn the gear.



One of seven tandem tows heading to sea under the Golden Gate Bridge, San Francisco, for the long voyage to Panama and on to Orange, Texas.

Tandem Tows

OCTOBER 8 marked the completion of the largest commercial ocean tow ever performed in the United States. A major oil company purchased fourteen LST's in San Francisco in the summer of 1948, and entered into a contract with the "Red Stack Tugs" of the Pacific Coast to tow these vessels to Orange, Texas. The LST's are 327 ft. long by 50 ft. beam and displace about 3200 tons and are to be used in offshore drilling operations in the Gulf of Mexico. The first vessels are now being outfitted at shipbuilding yards along the Gulf Coast.

The "Red Stack Tugs" on the Pacific Coast have been prominent in ocean and coastwise towing since 1883 and have made tows all over the Pacific Ocean and Bering Sea. They are the tugs of the Puget Sound Tug and Barge Company in Seattle, the Shipowners & Merchants Tugboat Company in San Francisco, and the San Pedro Tugboat Company in San Pedro. Five tugs were used in this operation and two LST's were towed in tandem by one tug. The first four tandem tows left San Francisco about four days apart and proceeded to Balboa, C. Z., where two of the tugs doubled back to San Francisco and the other two conducted a shuttle service between Cristobal and Orange, Texas. A fifth tug was dispatched from San Francisco with a tandem tow that proceeded directly through the Canal to Orange, Texas and the two tugs that returned from the Canal made a through tow to Orange, Texas on their second trip. The job was carried through in record time and with no difficulties, although one of the tows experienced some exceptionally bad weather in the outer perimeter of the great hurricane of September 19 that did so much damage in Cuba and Florida, and caused the Holland-American ship *Lochmonar* to go ashore on Little Cayman Island south of Cuba. One of the other tugs arrived in Orange, Texas the day before the Texas hurricane of September 3 and fortunately did not have to go through this bad weather.

The oil company owning the LST's negotiated the tows and placed the insurance through Johnson & Higgins in San Francisco. Walter Martignoni of the firm of Pillsbury and Martignoni surveyed the vessels and prepared them for this long tow and approved the towing arrangements.

Captains George Anderson, Kelley Sprague, George McConnachie, George Melanson and Ross O'Laughlin were masters of the tugs *Hercules, Neptune, Relief, Sea Prince* and *Sea Wolf* making this trip. Four of the tugs were powered with 1200 hp., turbo-charged Superior and Enterprise diesel engines and one of the tugs was powered with a 1900 hp. Fairbanks Morse diesel engine. The tows traveled a distance of 66,822 nautical miles, which is more than twice the distance around the earth, without any mishaps. The fourteen vessels were delivered far ahead of schedule. The first tow left San Francisco on June 18 and the last tow arrived at Orange, Texas on October 8.

Pacific WORLD TRADE

Reg. U. S. Pat. Off.

New Export Schedule

A new edition of the Comprehensive Export Schedule, containing all export control regulations in effect on September 30, 1948, has been issued by the Department of Commerce through its Office of International Trade.

The new edition, No. 26, supersedes the previous one issued on June 1, 1948, and includes all changes previously disclosed in Current Export Bulletins 459 to 485, inclusive.

Of particular interest to the export trade are the following:

1—A new section describing OIT's enforcement regulations. These regulations define unlawful practices in the handling of export control documents, establish a code of standards for persons appearing before OIT in connection with export control matters; define responsibilities of all parties involved in an export transaction; and provide a detailed procedure to guide exporters in preparing Shipper's Export Declarations.

2—Extensive revisions of the sections dealing with the issuance and use of export licenses. OIT's new licensing procedure is set forth in detail.

3—Description of the appeals procedure enabling exporters to appeal regulations or administrative actions of OIT.

4—A one-page digest which lists the applicability and limitations of all kinds of OIT export licenses.

Other parts of the schedule, including the Positive List of commodities requiring validated licenses for shipment to all destinations, are extensively revised.

Commerce officials pointed out that exporters should use the Comprehensive Export Schedule together with the Current Export Bulletins to keep up with changes as they occur. Current Export Bulletins are mailed free of charge to all interested persons on request. The new Export Schedule may be obtained for 25c from any field office of the Department of Commerce, or from the Superintendent of Documents, U. S. Printing Office, Washington 25, D. C.

San Francisco Firm Finances Plant in Holland

A San Francisco firm manufacturing steel drums, the Rheem Manufacturing Company, is channelling money and California-made equipment into Holland so that an up-to-date factory of steel containers will soon start production at Zaandam near Amsterdam in The Netherlands.

Partner in this venture is Holland's old established Evenblij Vaten N. V. at Koog aan de Zaan which has been struggling to satisfy the ever growing appetite of oil companies for high grade steel containers. Plans for expansion of their plant were crippled by Europe's chronic dollar shortage. Before dollar allocations could be made available by the Dutch Government, American private enterprise in search of good markets and sound investment, breached the gap, and a company under the name of Rheem-Evenblij was floated with a capital of some $570,000.00.

Heavy and light steel containers and a new type of drum with a special coating covering the inside will be produced at Zaandam and made available to an avid European market. Large orders from oil, chemical, fat and fruit industries have already been received by the new company.

Another European country, Belgium, is benefiting from this venture. Belgium will—until such time as the U. S. can export some of its steel—be the new plant's supplier of raw material.

The machinery is selected by the technical staff of the Rheem company and a large part of the equipment is being manufactured in their engineering plant in Stockton, California. Mr. A. Lightfoot Walker, general manager of the foreign department of Rheem Manufacturing Company, Los Angeles, will be on the board of the new company in Holland.

Rheem company is no newcomer in the field of operating overseas plants. Largely following the needs of the oil concerns, its plants have sprung up in Australia, Malaya, Brazil, Canada, and Argentina.

Pacific WORLD TRADE

Cunard Conducts Business In Fourteen Different Tongues

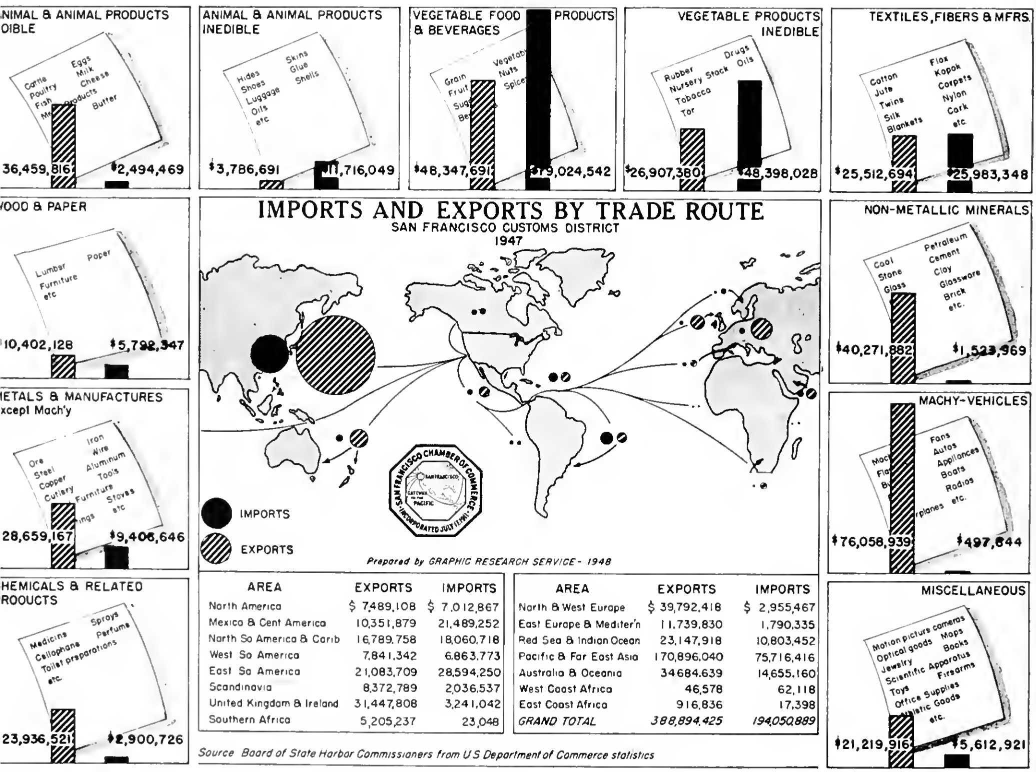
Transacting business with clients not conversant with the English language presents no problem at the Cunard White Star Line's main office in New York. To expedite business dealings with such persons the company has in its various departments 35 employees who can speak fourteen different languages. One member of this linguistic group is fluent in five while another can converse in four.

Members of the group may be called upon by any department of the company to speak with clients in Norwegian, Czechoslovakian, Danish, Dutch, Finnish, French, German, Hindu, Italian, Maltese, Russian, Spanish, Swedish or Urdu.

West Coast Foreign Trade

In June the United States exported goods valued at $1,013,100,000, and imports were valued at $615,600,000. The following are the Pacific Coast June values of exports and imports in *millions* of dollars:

	Exports	*Imports*
San Diego	2.6	1.5
Los Angeles	15.2	17.7
San Francisco	27.9	23.7
Oregon	2.0	1.8
Washington	14.3	12.7



AREA	EXPORTS	IMPORTS
North America	$ 7,489,108	$ 7,012,867
Mexico & Cent America	10,351,879	21,489,252
North So America & Carib	16,789,758	18,060,718
West So America	7,841,342	6,863,773
East So America	21,083,709	28,594,250
Scandinavia	8,372,789	2,036,537
United Kingdom & Ireland	31,447,808	3,241,042
Southern Africa	5,205,237	23,048

AREA	EXPORTS	IMPORTS
North & West Europe	$ 39,792,418	$ 2,955,467
East Europe & Mediter'n	11,739,830	1,790,335
Red Sea & Indian Ocean	23,147,918	10,803,452
Pacific & Far East Asia	170,896,040	75,716,416
Australia & Oceania	34,684,639	14,655,160
West Coast Africa	46,578	62,118
East Coast Africa	916,836	17,398
GRAND TOTAL	*388,894,425*	*194,050,889*

Source Board of State Harbor Commissioners from U S Department of Commerce statistics

These Too Are World Trade

Three seven-foot-high elephants, weighing a total of 8,150 pounds, strolled up the gangplank of Moore-McCormack Lines' Good Neighbor liner *Argentina* at Pier 32, North River, New York, and after being securely tucked in, settled comfortably for a cruise to Buenos Aires.

Liza and Jaga, the two smaller elephants, are shown as they were greeted by the ship's bell boys James V. Rocco and Jack Stidolph as they boarded the ship. The third pachyderm, Holly, had already gone aboard.

The three elephants, all females, are part of a shipment of forty that arrived recently from India. Holly, Liza and Jaga have been purchased by the Gran Ciro Americano, a circus in the Argentine capital, and are en route to their new home.

Credit Conditions in Latin American Countries

Collections Paid, Collections Outstanding, and Confirmed Letters of Credit Outstanding August 31, 1948, as Reported to Federal Reserve Bank of New York by twelve New York City Banks, and quoted by the Foreign Trade Bulletin of the American National Bank, Chicago.

Country	Schedule of Prompt Payments		Collections paid during August; per cent of total number of items: Prompt	Up to 30 days slow	31 to 60 days	61 to 90 days	Over 90 days	Outstanding Aug. 31, 1948 in thousands of dollars: Collections	Letters of credit Confirmed
Argentina	2	mos.	23.3	32.8	15.5	6.0	22.4	14,318	64,869
Bolivia	2	mos.	58.0	25.0	8.1	3.8	5.1	1,596	5,055
Brazil	6	wks.	3.7	3.7	15.6	14.5	62.5	53,384	16,008
Chile	2	mos.	36.8	7.6	6.1	2.9	46.6	4,745	9,878
Colombia	7	wks.	12.8	15.6	25.7	19.8	26.1	9,977	16,534
Costa Rica	2	mos.	18.7	2.2	0.9	0.9	77.3	1,018	525
Cuba	3	wks.	77.8	15.0	4.2	1.4	1.6	3,703	6,425
Dom. Rep.	1	mo.	72.4	15.2	4.4	2.9	5.1	582	1,805
Ecuador	6	wks.	63.4	23.4	7.0	1.1	5.1	2,275	2,029
Guatemala	6	wks.	59.8	22.2	11.3	2.2	4.5	783	739
Haiti	1	mo.	88.2	8.8	1.4	0.8	0.8	327	410
Honduras	1	mo.	51.8	22.2	14.9	5.4	5.7	613	284
Mexico	1	mo.	78.4	13.9	3.3	2.2	2.2	3,331	29,204
Nicaragua	6	wks.	78.7	11.1	3.5	2.0	4.7	765	83
Panama	1	mo.	86.0	9.0	2.5	0.9	1.6	1,046	2,279
Paraguay	2½	mos.	26.6	34.3	6.7	10.5	21.9	359	1,137
Peru	2	mos.	55.5	25.3	2.3	4.4	12.6	2,759	3,976
Salvador	1	mo.	52.1	26.2	13.0	4.1	4.6	888	1,314
Uruguay	2	mos.	61.4	19.2	6.2	0.9	12.3	1,644	6,757
Venezuela	6	wks.	68.0	19.3	6.7	2.3	3.7	9,505	20,664
Br. Guiana	6	wks.	81.6	16.3	....	....	2.1	36	....
Du. Guiana	5	wks.	78.0	5.1	....	6.8	10.1	142	408
Fr. Guiana	5	wks.	....	....	....	....	....	....	....
Total			49.7	14.0	9.4	6.3	20.6	113,796	190,383

Jr. World Trade Associations Continue to Draw

There seems to be no limit to the interest in world trade affairs on the part of the young men attached to importing and exporting firms, as well as steamship, insurance and other allied activities. The Associations in Los Angeles and San Francisco are the means by which their members keep in advance of non-members on matters relating to their business. The photos below show groups of recent additions to the roll of the San Francisco Association.

Ted Bartels, Matson; Dirk Van Meurs, Wileman Bros. & Elliott; Art Anderson, Otis, McAllister & Co.

Dave Cowie, Tidewater Associated; Ray Phillips and Fred McKillop, Getz Bros. Co.

Admiralty Decisions

By HAROLD S. DOBBS *of San Francisco Bar*

Maintenance Allowed for Seaman's Frolic

IN PREVIOUS ARTICLES, I have criticized the rule of *Aguilar v. Standard Oil Co.*, reported in 318 U. S. 724, where you will recall the libelant, a seaman, was injured in close proximity to the ship and was therein permitted to recover maintenance and cure over the objections of the shipowner. Cases decided since that time have on too many occasions taken the Aguilar rule as a rule of thumb and permitted many seamen to recover for injuries so far removed from the service of the ship that it becomes somewhat ridiculous.

A case decided by our own Ninth Circuit Court of Appeals, reversing the District Court for the Southern District of California, is a good example of what I have preached from time to time. In the case of *Ellis v. American Hawiian Steamship Company*, the District Court denied libelant's prayer for wages, maintenance, care, cure and repatriation based upon his disablement for an injury claimed to have been received during the course of his employment while in Manila, P. I.

Libelant shipped out of the port of San Pedro as Third Assistant Engineer on the S. S. *Cape Saunders*, signing shipping articles for a voyage to foreign ports for a period not to exceed six months. The vessel arrived in Manila. There the ship posted on its bulletin board a notice stating that the only safe place of recreation in Manila was the United Seamen's Service Club, a private, charitable, non-profit organization having a club house, a restaurant and swimming pool some ten miles distant from the ship. Following the advice of this notice, libelant and a shipmate, the first assistant engineer, were transported to the United Service Club. While there the two friends had luncheon, libelant drinking three bottles of beer—the size of the bottles not being disclosed. A blood examination in the hospital led to a diagnosis, of which the libelant states:

> "While we do not here contend that appellant was definitely intoxicated, it does appear that his indiscretion may have resulted from the effects of alcohol which is shown by the hospital certificate to have been one milligram of alcohol per cubic centimeter of blood over three hours after the accident."

The club rented to libelant and his companion swimming suits for swimming in the pool and shortly before three o'clock in the afternoon they began swimming there. The water in the pool was not full up, there being about four feet of water in the place where libelant was injured while diving from a low spring board about three feet above the surface of the water. Libelant was an expert diver, but on his third dive struck the bottom of the pool a glancing blow with his head which occasioned the injury leading to his disablement.

Libelant was taken to the hospital in Manila where he remained until after his ship had sailed. The Army later flew him to San Francisco where he was again hospitalized, he remaining there from November 18, 1945 to January 6, 1946. He then flew to Los Angeles. There he was still under care of the United States public hospital service until October 1, 1946. He was not required to pay anything for the medical care which he received because of his disablement. So far as his ship is concerned, he was off ship duty at the time he was injured at about 3 p.m. He was due to return for either the 5 p.m. to midnight watch or the midnight to 8 a.m. watch that night or the following morning.

The libelant seeks to support the decree on the following grounds: (1) That the injury received was not in the course of libelant's employment; (2) that the libelant's diving in the pool was wilfull misconduct and (3) that the return of libelant to San Francisco instead of San Pedro, California, was a sufficient performance on behalf of the shipowner of the obligation to repatriate him.

Libelant relies upon the decision of the Supreme Court in the Aguilar case, supra. The Ninth Circuit Court of Appeals cites with disapproval from the decision in *Collins v. Dollar S. S. Co.*, which was decided long before the Aguilar case, where the District Court held that a seaman on shore leave, injured while in a game of baseball, was not in the employment of the ship at the time of the receipt of his injury. And also, *Smith v. American South African Line*, where the seaman was struck by a motorcycle on a public street about two miles from his vessel. The Ninth Circuit referred to the discussion of the aforementioned cases in the Aguilar case wherein the Supreme Court said:

> "We think that the principles governing shipboard injuries apply to the facts presented by these cases. To relieve the shipowner of his obligation in the case of injuries incurred on shore leave would cast upon the seaman hazards encountered only by reason of the voyage. The assumption is hardly sound that the normal uses and purposes of shore leave are 'exclusively personal' and have no relation to the vessel's

(Please turn to page 86)

Andrew C. Disher
Andy's dinner at Port Engineer meetings is not limited to the oat bun he is holding to his ear in this picture.

Port Engineer of the Month

SAN FRANCISCO

ANDREW C. DISHER

Of U. S. Army Transport Service

- - With The

Many engine men who follow the sea were born "among the heather," and no exception shall be made to this statement when we speak of Andrew C. Disher. In 1903 this Senior Machinery Inspector of the U. S. Army left his native Scotland on the Cunard steamer *Caledonia* to wend his way to America to seek his fortune. Settling in San Francisco, young Andy served his time as machinist apprentice at the Union Iron Works, and later sought employment sailing coastwise in the engine department.

From San Diego to Vancouver, Andy worked his way up in ships of the North Pacific and the Pacific Coast Steamship Companies, and rounded out his "outside" time with a five year hitch with the Union Oil Company on tankers. While waiting for a ship in 1916, he was offered a temporary job as relief chief engineer on Northwestern Pacific ferryboats, since one of the regular engineers had pedalled his way to physical ruin on a wild bicycle ride down the Sausalito hillsides. Despite the quick recovery of the injured man, Andy's temporary job lasted twenty-four years.

Andy served on them all, the *Tiburon*, the *Sausalito*, the *Eureka*, the *Cazadero*, the *Redwood Empire* and others, but his first love was the *Tamalpais*, the yacht of the fleet. A familiar sight to all commuters, Andy stood at the engine room door, clad in his blue uniform, four stars on his sleeve for his twenty years' service, and the gold inscription "Chief Engineer" upon his watch cap, chatting with the friends he'd made through the years of bay travel as each one boarded the vessel. Then the "stand-by" bell, and Andy would grab the throttle—"Full speed ahead" and the *Tammie* would be on her way.

Memories of suicide jumps which broke the routine of a trip to the time the *Sausalito* broke her walking beam and the main rod tore up the Upper Deck Cabin, are still in Andy's mind. "The grandest job a man could have had," says Andy as he reminisced of his days on the N. W. P.

Now Senior Machinery Inspector for the U. S. Army Transports, Andy's looking forward to the day when he'll retire and his only worry will be, "Where do the 49ers play next Sunday?"

Port Engineers Have Some Great Meetings Scheduled

MARSHALL T. J. GARLINGER, member of the Board of Governors and chairman of the program committee of the Society of Port Engineers, San Francisco, has done a fine job of arranging programs for the Society through 1949. The December 1 meeting, for which the program is to some extent tentative, is expected to be sponsored by the Combustion Engineering Company and its San Francisco representative, the Robert L. Johnson Company, whose Messrs. Johnson, Burleson, Lasher and Richards will show films on the building of a Combustion Engineering Company boiler and the history of boilers from 1882 to now.

A special feature on this program will be the presenting of an ultra-slow motion technicolor picture showing flames inside the boiler furnace and one showing the action of steam inside a boiler under actual working conditions. The latter picture will be offered by the Dearborn Chemical Company.

During December at a time to be announced by postcard to the members, there will be a stag party and smoker.

The January meeting will be handled by Navy officers who will enlarge on the advantages for marine engineers to belong to the Naval Reserve, in which eligible men will be given advisory or consultant work during a

Port Engineers-

period of national emergency.

In February Walter B. Hill will address the meeting on the application and maintenance of the Copes automatic feed valve.

At the March meeting Westinghouse Electric's Micarta Division will sponsor a discussion of the proper engineering and design of Micarta applications to marine work such as bearings, pump packing and electrical insulation.

From April through December, one meeting will be devoted to the non-destructive test of marine machinery parts by means of X rays, gamma rays and magniflux.

Jack Crose of the Gisholt Company will conduct a meeting devoted to dynamic balancing.

Hot plastic and bottom paint will come in for a discussion by Captain Petrie of the Navy.

Merrill Gigy, representing the Lakeshore Engineering Company, will discuss deck machinery for ships.

Hydraulic steering gear and associated equipment will be handled by Jim Crough who is associated with Hyet & Struck. Jim was appointed during the war to instruct Navy and civilian personnel in the handling of such equipment.

A talk on the history of steam boilers will be presented by Larry Rapp of Babcock & Wilcox.

A talk on the design of propellers, past, present and future, will be offered by Durand Propeller Company's Mathis.

And somewhere during the year an outstanding program on what chief engineers should know about the stability of vessels will be handled by President Phil Thearle. Carl Wall and George Harlan of the Army's Port of Embarkation are already at work on the program.

Los Angeles-Long Beach October Meeting

"Industrial Safety and Gases in Void Spaces" was the subject of the October 6 meeting of the Los Angeles-Long Beach Society of Port Engineers held at the La-Fayette Hotel. The speaker was B. F. McDonald of B. F. McDonald Safety Appliance Company, San Francisco.

His talk dealt with the gas hazards in ship repair. Common hazards present in ships, he said, are combustibles such as hydrogen and acetylene; toxic gases (CO^2, H^2S, and Cyanide); oxygen inefficiency; and carbon dioxide. McDonald's suggestions for the control of these hazards was by the use of venturi tubes and blowers. He stressed the importance of determining the presence of gases. For protection he advised the use of canister-type masks, air supply by means of hoses, oxygen breathing apparatus and flame safety lamps.

George A. Bradford

Port Engineer of the Month

LOS ANGELES

GEORGE A. BRADFORD

Of World Wide Tankers, Inc.

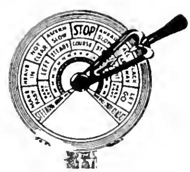
A native of River Rouge, Michigan, George Bradford went to Torrance, Cal., in 1921, and it was there that he served his apprenticeship as machinist, tool maker and designing engineer for the National Supply Company.

At the old Los Angeles Shipbuilding and Drydock Corporation George was a machine shop foreman, and later was promoted to night superintendent. For the Navy George set up a training school for the training of machinists and helpers. He worked for the West Coast Shipbuilding and Drydock Corporation for a couple of years, starting as an estimator and engineer, and was promoted to assistant general manager and chief engineer in charge of repairs. George was a Port Engineer for Hillcone Steamship Corporation for a while, worked for P. Banning Young as marine surveyor for the United States Salvage Association and also did surveying for the London Salvage and Marine Underwriters.

George prepared specifications for the S. S. *John Goode*. In June 1948 he began work for World-Wide Tankers, Inc. as marine superintendent, and for Time Oil Company as consulting mechanical engineer. He is a vice president of Time Oil Company, of which World-Wide Tankers is a subsidiary.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

THE RULES OF THE NAUTICAL ROAD

AS INTERPRETED BY COURT DECISIONS THROUGH THE YEARS

In our issue of October and November, 1947, we published under the above title a discussion of The Rules of the Nautical Road. We have decided to discontinue further discussions on this topic.

We desire to refer our readers for further information on this subject to the excellent book entitled "The Rules of the Nautical Road" by Captain Raymond F. Farwell and copyrighted by the United States Naval Institute.

Our articles under this title contained quotations from the book authored by Captain Farwell, for which he was given credit in the articles, and also contained material which was similar to that included within Captain Farwell's book, for which specific credit was not given to Captain Farwell.

The Pacific Marine Review is glad to give credit to Captain Farwell and to the United States Naval Institute for any material contained in its said two articles published in October and November, 1947, which is identical with or similar to that contained in Captain Farwell's book "The Rules of the Nautical Road."

In publishing our articles, we believed that we were sharing with the United States Naval Institute its mission in "the advancement of professional, literary, and scientific knowledge in the Navy."

NOON FIXES BY UNUSUAL METHODS

THIS ARTICLE is designed to give a short discussion of some of the unusual methods of determining the position of the vessel.

First, let us take up a condition where the body is near the zenith or when the sextant altitude is near 90°. I'm sure all navigators will agree that it is rather difficult to obtain an accurate meridian altitude or noon latitude sight when the altitude is extremely high. Due to the fact that the azimuth changes quite rapidly and that the altitude changes very slowly, we find ourselves chasing all over the bridge trying to be sure we have the sun at its greatest altitude. By comparison with other navigators, who have been going through about the same antics, we find quite often that our sextant altitudes differ by from one to three or four minutes. Then no one is sure of his sight.

A simpler and more accurate method of determining the noon position is to make two observations. One should be made just a few minutes prior to meridian transit and one a few minutes after meridian transit. Upon making the first observation, the G.C.T. is noted and the sextant altitude is noted. The G.H.A. and Declination of the Sun is determined and the Geographic position of the sun at the instant of observation is plotted. Next, the corrections from tables A, B, and C of the Nautical Almanac are applied to the sextant altitude to get the correct observed altitude. This corrected altitude is then subtracted from 90° to get the Zenith distance. Compare the G.C.T. of the observation with the G.C.T. of Local Apparent Noon. This difference should never

be more than 10 minutes and preferably much less—say three or four minutes. Then advance the Geographic position of the sun along a line through that position parallel with the course line, a distance equal to the distance your vessel would travel in the interval between the time of observation and local apparent noon. Next, measure off the zenith distance from the latitude scale at the side of the chart and swing an arc from the advanced geographic position of the sun in the direction of your vessel. After the sun has transited the meridian, again measure its altitude noting the G.C.T. of the observation. Correct this altitude and substract it from 90° getting the zenith distance. Again plot the geographic position of the sun at the instant of observation and lay down a line parallel to the course line through this position. Then retard the geographic position of the sun along this line for the distance the vessel has traveled in the interval between local apparent noon and the time of this second observation. Again measure off the zenith distance with a compass and swing an arc in the direction of your vessel. One of the intersections of these two arcs will give the position of the vessel at noon and your D.R. position should indicate which intersection. An example follows:

On June 5, 1948 the navigator of a vessel on a course of 269°T. at a speed of 15K whose D.R. noon position was Latitude 23° 01′N., Longitude 173° 02′W. observed the altitude of the sun's L.L. to be 88°33′.7 at $23^h\ 25^m\ 10^s$ G.C.T. Later at transit as a check he observed the greatest altitude to be 89° 26′.1 after transit at $23^h\ 36^m\ 15^s$ G.C.T. He again observed the altitude of the sun's L.L. to be 88° 29′.3 from a 45 ft. H.E.

What was the vessel's noon position?

First by the hour angle method, he finds the G.C.T. of L.A.N.

	Longitude	173° 02.′0 W
G.H.A. of Sun at 22^h G.C.T.	=	150° 23.′8
Sun has to travel to transit		22° 38.′2
Corr. to G.H.A. for $1^h\ 30^m$	=	22° 30.′0
Sun has to travel to transit		8.′2
Corr. to G.H.A. for 33^s	=	8.′3
G.C.T. of Local Transit		$23^h\ 30^m\ 33^s$ on June 5

He then finds the geographic position of the bodies at the time of the two observations.

1st Observation.
G.C.T. $23^h\ 25^m\ 10^s$

G.H.A. at 22^h G.C.T.	=	150° 23.′8
Corr. for $1^h\ 25^m$	=	21° 15.′0
Corr. for 10^s	=	2.′5
G.H.A. or Long. of Sun at Observ.	=	171° 41.′3
Declination at Obser.	=	22° 37.′3 N.

Last Observation
G.C.T. $23^h\ 36^m\ 15^s$

G.H.A. for 22^h G.C.T.	=	150° 23.′8
Corr. for $1^h\ 36^m$	=	24° 00.′0
Corr. for 15^s	=	3.′8
G.H.A. or Long. of Sun at Observ.	=	174° 27.′6
Declination at Observ.	=	22° 37.′4 N.

The next step is to plot the two positions on the chart advancing the first position 1.4 mi. along the direction of the course line and retarding the second position 1.5 mi. along the direction of the course line to allow for the ship's run between the observations and noon.

Now apply the corrections to the observations.

1st Observation			Noon Observation		
Sextant altitude		88° 33.′7	Sextant alt.		89° 26.′1
Corr. A.B.C.	+	9.2		+	9.′2
Observed alt.		88° 42.′9	Observed alt.		89° 35.′3
		90°			90
Z.D.	=	1° 17.′1	Z.D.		0° 24.′7 N.
			Dec.		22° 37.′3 N.
			Lat.		23° 02.′0 N.

Last Observation

Sextant altitude		88° 29.′3
	+	9.′2
Observed altitude		88° 38.′5
		90°
Z.D.	=	1° 21.′5

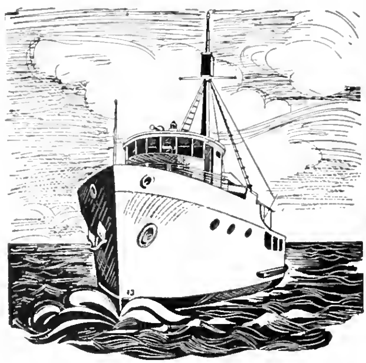
The latitude check is plotted. Then the Z.D. of the first observation is measured with a compass on the latitude scale and an arc with a radius equal to this distance is swung from the first G.P. This is repeated for the last observation. The intersection of these two arcs should fall on the plotted latitude check line or at least will be very near it if the noon sight is good, thus giving an accurate determination of the vessel's noon position. This procedure may seem long and drawn out while reading, but it can be completed in a remarkably short time in practice.

Another method of determining your noon position more accurately when the altitude of the sun is over 75° and the vessel is nearly stationary or on a nearly East or West course is to make an observation 10 minutes or so prior to L.A.N. and note the G.C.T. of the observation and the sextant altitude. Next make an observation for latitude at the greatest altitude and work your latitude sight. Then set your instrument at the same alitude as that of the first observation and wait until the sun subtends this same altitude and note the G.C.T. again. The mean of these G.C.T.'s will be the G.C.T. of L.A.N. From the Nautical Almanac determine the G.H.A. of the Sun at this G.C.T. and it will be the equivalent of your longitude. With our present day methods of checking our chronometer so that we are sure of our time this method is comparatively accurate.

If your course is not nearly East or West a correction to apply to the altitude of the first observation for use with the second observation to get a reasonably close approximation may be found as follows. Upon making the first observation make note also of the azimuth of the sun. Then when your latitude sight is made at noon notice the G.C.T. with the time difference between the first observation and the noon observation and the speed of your vessel, and you can determine the distance run between observations. Using twice this distance run and your course, find the difference of latitude in Table Three, Bowditch. Now with this difference of latitude and the azimuth of the first observation, you may find in the "Altitude Correction for D.R. Latitude" tables on the next to the last page of any volume of H.O. 214 the correction to apply to the sextant altitude of the first observation in setting your sextant for the last observa-

(Please turn to page 86)

Coast Commercial Craft



RADAR PAYS FOR ITSELF ON ONE TRIP

By MANUEL O. MEDINA
Managing Owner of M. V. Normandie
and
RONALD T. STRONG
San Diego Manager of Westinghouse Electric Corporation

TUNA BOAT FISHING in Southern California is big business. 5 1/3 million cases of canned tuna were packed in 1947 and still the public's appetite for the succulent sea food was unsatisfied. In San Diego alone the retail value of the tuna pack for 1947 is estimated at over 100 million dollars.

To catch this quantity of fish requires more than just a fisherman and a rod and line. There was a time when a small fishing boat could run out only a day's trip from San Diego or San Pedro and bring back several tons of fish. Today the best fishing is off the coasts of Central and South America, and round trips of 5000 miles from San Diego are common.

The modern tuna clipper, with its elaborate refrigeration equipment, was evolved to meet this condition. Of the more than 100 large tuna clippers operating out of San Diego in 1947, M. V. *Normandie* was high boat, making five trips and bringing in to the cannery 1978 tons of fish.

The *Normandie* was built in 1928 and taken over by the Navy in 1942. For many dangerous months, she and several other San Diego tuna clippers operated about the Solomon Islands supplying our troops there with fresh frozen meat from New Zealand. Three of these clippers were lost to Japanese bombs, one was wrecked in a typhoon at Okinawa, but *Normandie* came back to resume its peacetime occupation.

When *Normandie* was re-purchased by its original owners from the Navy, she had on board a Navy type radar. Use of this equipment quickly demonstrated the great value of radar in the long fishing trips. At times when foul weather was brewing and other fishing vessels were fog bound, *Normandie* could proceed confidently into a sheltered harbor, guided solely by her radar, with a line of "blind" boats following thankfully in her wake.

But Navy radars are complicated, and many of them have seen hard service. This radar required excessive and costly maintenance. Therefore, the owners decided to invest in a modern radar, simple, self-contained Westinghouse type MU, developed to meet these requirements.

The antenna may be mounted separately at the mast head if greater height is required. After considerable study, however, the owners decided that the combined mounting as shown on *Normandie* gave sufficient height for all practical purposes. This mounting has definite advantages in ease and economy of installation, reliability and ease of access for maintenance, all important factors in the fishing fleet.

While the 40 and 16 mile ranges of the set are important for navigation, the shorter ranges of 4 and 1½ miles are equally important in the work of fishing. Before a tuna clipper gets on the fishing grounds it must load up all its tanks with bait, 6 to 10 inch live sardines. Bait is taken in a seine handled by a small boat, and involves close-in work along the beaches.

Recently *Normandie* went out from San Diego to get bait preparatory for sailing to the Central American fishing grounds. The six to ten inch sardines and mackerel used as bait are taken in a seine cast close to the beach from a motor dory. It was a dark and foggy night and the motor dory disappeared in the darkness almost immediately on leaving the ship. Ordinarily the dory would have had great difficulty in finding the ship again on its return, searching blindly with the ship using flares and firing guns. Hours have been spent, and sometimes a whole night, in groping around for rejoining.

But with the MU radar, *Normandie's* navigator could watch the motor dory proceed to the beach and cast its net. On completion of the cast, the motor dory crew was

astonished to have *Normandie* slide up alongside of them, out of the fog. At no time was the navigator in doubt as to the location of the motor dory and he could even follow on the radar scope its movements in circling to draw out the seine. Both time saving and safety may be credited to the radar in this operation.

Normandie then returned to San Diego harbor, M. O. Medina at the wheel, George Stokely, navigator-radioman conning from the radar scope. With visibility practically zero, there was no difficulty in threading a way through the channel and among the anchored ships in the bay. Radar showed the way clear through to the correct berth on the Embarcadero.

After this experience, M. O. Medina says, "I would take my ship anywhere, anytime, no matter how bad the visibility, if it has a modern radar. I would not want to operate a tuna boat without a radar."

Tuna clippers do not operate on fixed routes, well marked with modern navigational aids. They must follow the fish, in unmarked bays and among the reefs of poorly charted islands. In every operation of the fishing boat, a reliable radar is needed, primarily for safety, secondarily for time saving.

When *Normandie* or one of her sisters puts to sea, she represents an investment close to a half million dollars. Even more important, she contains the lives and fortunes of some seventeen men who constitute her officers and crew. These men, with the boat owners, work on shares on each trip,—no fish, no pay. With skill and luck, one fisherman's share for a three months trip may run as high as $3000. Or it may be nothing. Too many crews in the last few years have returned penniless, in other vessels, with all their catch and their personal belongings lying with the ship deep on some distant reef. And some have not returned. Radar would have prevented most of these losses. For with radar, the navigator has a clear indication of every object projecting above the earth's curvature within a forty mile radius. He may proceed through a dense fog with perfect confidence that no other vessel is in dangerous proximity. With the Westinghouse radar he may fix his position from high landmarks forty miles distant or from a small buoy only 100 yards away. He may enter a fog bound harbor, seeing plainly on his scope the curve of the beach, islands, points, buoys and adjacent vessels.

Other major equipment on the *Normandie* includes: Main propulsion by Union Diesel heavy duty engine, 850 H.P.; Electric power for pumps, refrigeration, etc., supplied by two Union Diesel Auxiliary Engines, one a 6 cylinder, 175 KW and the other a 4 cylinder, 125 KW, both driving General Electric generators. Cargo handling equipment—a small Campbell Machine Company winch powered with a 5 H.P. General Electric motor, handling the cargo boom. Refrigeration is supplied by four York Model D-8 compressors driven by General Electric 30 H.P. motors.

Westinghouse MU Radar. Indicator Console mounted in chart room of Normandie.
At the left is M. O. Medina, principal owner of Normandie, and at the right, A. C. McBride, Jr., Electronic Engineering Company, Westinghouse Radar Distributor and Installer.

A. C. McBride, Jr. (upper right), explaining transmitter to George Goltz, Chief Engineer, Normandie. Below is Ronald T. Strong, of the Westinghouse San Diego office.

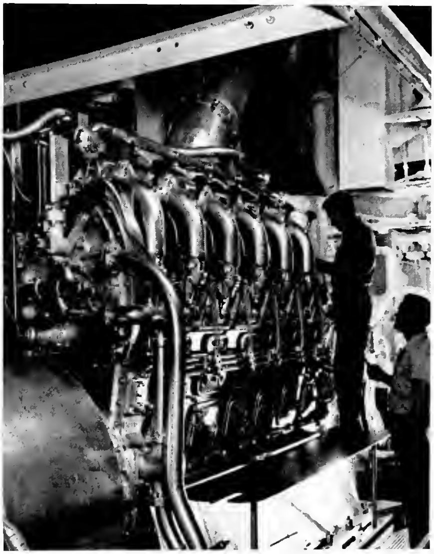
SOCONY-VACUUM'S NEW DIESEL TUG EQUIPMENT

Few people outside the petroleum industry can visualize the extent of the maritime operations of oil companies, or realize that their marine department has many thousands of employees, including land and sea-going engineers, naval architects, electrical machinery experts, and other technicians. Tankers, which represent a substantial part of the American Merchant Marine, are by no means the only type of vessel owned. Some idea as to the cost of keeping American oil tankship fleets up-to-date will be gained from the fact that now building in U. S. yards are 63 sea-going ships valued at more than $320,000,000. Smaller craft, too, represent a tidy sum in dollars.

The ramifications of the petroleum business are so extended that a variety of craft are needed for domestic and foreign operations, such as harbor tugs, river towboats and barges, geophysical and exploration cruisers, oil well drilling barges, floating hotels for off-shore drilling crews, derrick barges, piledriving barges, and—the latest addition—converted L.S.T.'s, which are used in connection with drilling at sea in the Gulf of Mexico. In addition, oil companies contract for extensive ocean towing work with towboat companies.

Recently, the Socony-Vacuum Oil Company's marine transportation department decided to modernize its New York district tug fleet. A new tug, built at Port Arthur, Texas, has been purchased from the General Motors Corporation, and two existing steam tugs are to have their machinery replaced with G. M.-Cleveland Diesel engines of 1,000 hp. each. Socony's marine department is under the direction of Frederick R. Pratt, with W. B. Jupp as manager.

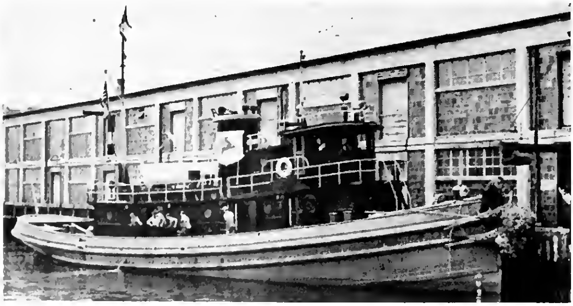
"Socony 10", the new tug, recently made the run from Port Arthur to New York under her own power, averaging about 10½ knots. Shortly after her arrival a demonstration run was made from Bayonne, N. J., to Port Socony, Staten Island, N. Y., for the benefit of a number of newspapermen and trade journal editors.



The new 12-cylinder V-type General Motors Cleveland Diesel engine of 1000 bhp. for the reconverted "Socony 10" tug being modernized for the Socony-Vacuum Oil Company's New York district tug fleet.

She is typical of the fine steel tugboats turned out at the yard in Port Arthur. The propeller is driven through an airflex coupling and reduction gear, a comparatively simple installation.

"Socony 10" has very pleasing lines. She is 102 ft. long,



"Socony 10," one of the two tugs of the Socony-Vacuum Oil Company to have its steam engines replaced with G.M. Cleveland Diesel engines of 1,000 HP.

by 24 ft. beam, 12 ft. 4 in. depth and 10 ft. 6 in. draft, and is classed to the American Bureau of Shipping highest standard of workmanship. Her propelling unit consists of a 12-cylinder V-type G. M.-Cleveland Diesel engine of 1,000 bhp., and of the two-cycle type.

For auxiliary power there are two 30 kw. General Motors Diesel-generator sets, one small Diesel-driven, self-contained, pumping unit, and a large electric storage battery for starting the main engine, and which also provides lighting current when the Diesels are not running.

Accommodation is provided for a total of ten officers and crew. She is equipped with ship-to-shore telephone, and with a radio direction finder.

Work on converting the two Socony steam tugs to Cleveland Diesel power will commence in January. By mid-summer they should be ready to join their sister in New York Harbor.

On the Ways

New Construction—Reconditioning—Repairs

Bethlehem Converts "Winged Arrow"

T. C. Ingersoll, manager of the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division, has announced that the yard was awarded a contract for the reconversion of a Navy AP, the *Winged Arrow*, to a standard C-2 cargo vessel with accommodations for eight passengers. Work on this job has already started and is scheduled to be completed around the first of the year. Highlights of this major conversion include complete overhaul of the vessel's machinery, removal of troop facilities and defense features.

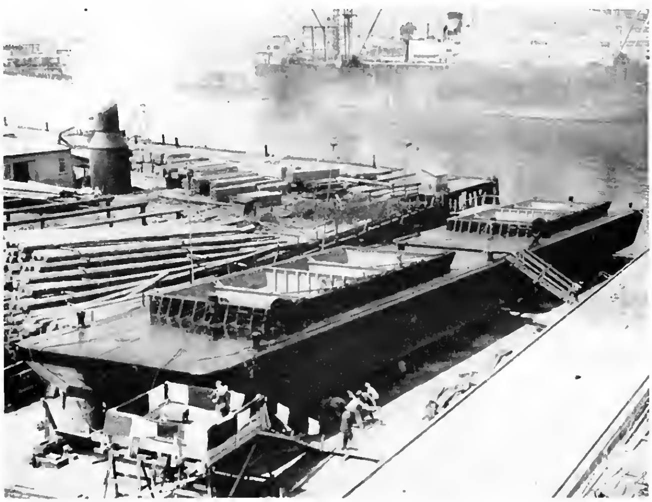
The *Winged Arrow* was built at Moore Drydock Company in December 1943 and later operated as a freighter by McCormick Steamship Company. In the summer of that year it was converted to a Navy AP and operated by the Navy until October 1946, when it was laid up in the U. S. Maritime Commission Reserve Fleet at Suisun Bay. The vessel was surveyed in February 1948.

The *Winged Arrow*, which is 435 feet long, has a beam of 63 feet and is of 6,214 gross tons, is one of ten such vessels purchased on the Pacific Coast by Waterman Steamship Company of Mobile, Alabama. It is expected the *Winged Arrow* will be operated in round-the-world trade.

Double Barge Launching

A unique double launching, in which a pair of barges, tied together, slipped tandem style down a single way, recently added two new hopper barges to the San Francisco Embarcadero clean-up fleet.

The twin barges (pictured opposite) are 100′ long and 9′ 6″ deep, with a 29′ beam and 200 ton capacity. Keels were laid last March on a single way, and the two all-welded steel vessels were designed, fabricated, erected and launched simultaneously at the Pacific Coast Engineering Company yards in Alameda at a cost of $135,000.



NEWS FLASHES

WATERMAN CONVERSIONS

The ten Waterman C-2 cargo vessels on the Pacific Coast have now been assigned and are broadly distributed to West Coast yards. In addition to those previously announced:

The WINGED ARROW was awarded to Bethlehem, San Francisco.
The HERALD OF THE MORNING to Everett-Pacific.
The DELSANTOS to Todd, San Francisco.
The DASHING WAVE to the Triple A Machine Shop.

The final distribution shows:

Everett-Pacific--three ships.
Bethlehem, San Francisco--one.
Todd, Seattle--two plus one drydocking.
Todd, San Francisco--two.
Puget Sound Bridge & Dredge--one.
Triple A Machine Shop--one.

* * * * *

LUCKENBACH CONVERSIONS

The next big conversion job for Pacific Coast yards will be Luckenbach's C-3s. Specifications have been completed for most of the ships and it is expected that bids will be called for by the Maritime Commission before mid-November. It is likely that all seven of the ships will go to West Coast yards with two to Puget Sound and five to San Francisco Bay yards because of the vessels being presently located in those areas. The SEA STAR and the SEA BARB are in Seattle. The SEA FLYER, SEA RUNNER, SEA BASS, SEA CAT and SEA DEVIL are in San Francisco Bay. The first bids tobe called will be on the SEA STAR and SEA FLYER. Another pair of ships, SEA DEVIL and SEA BASS will follow, with the other three bringing up the rear.

Six of the vessels were built at Western Pipe and Steel and one at Ingalls. Surveys were made by M. J. Ryan.

* * * * *

BIG TANKERS

No announcement has been made on the 30,000 ton tankers known as the Navy or National Defense type. Bids are under consideration and it is expected that

at least part of this program will go to West Coast yards.

Stevens Institute has completed tests on a model of a 720 ft. tanker to be built by Shipbuilders Company, Inc. of New York. Following the basic lines of the NORMANDIE the tanker will have a beam of 108 ft. and draft of 33 ft. with a displacement of 51,000 tons and a top speed of 20 knots.

* * * * *

COMMERCIAL SHIP REPAIR BUYS SAN FRANCISCO YARD

The Commercial Ship Repair has again expanded its operations and purchased the Maritime Engineering and Ship Repair Company of San Francisco.

* * * * *

WESTINGHOUSE AT SUNNYVALE

The 57-acre Joshua Hendy Iron Works Plant at Sunnyvale, Cal., leased 19 months ago by Westinghouse, has been purchased outright by Westinghouse at $3,472,000. Further details will be found elsewhere in this issue.

* * * * *

COLUMBIA STEEL COMPLETES PACIFIC COAST MILL

The new cold-reduction sheet and tin plate mill at the Pittsburg, Cal. plant of Columbia Steel Company was placed in operation October 21. Alden Roach, well known in shipbuilding circles in the West, has been elected president of Columbia.

* * * * *

TODD GETS BIG CONVERSION JOB FOR TURKS

The former Navy transport IMPERIAL, purchased by the Turkish government, will be converted to a passenger liner for world wide service by the Turkish government, the work being done by Todd's San Francisco yard. Three other Navy transports, the MONTEREY, ACONCAGUA and COPIAPO will also be converted by Todd for the same owners, the work being done by Todd's Brooklyn and Hoboken yards.

* * * * *

BIG GENERAL ELECTRIC ORDER

The General Electric Company was awarded what amounts to nearly a clean sweep of the propulsion and electrical equipment on three new round-the-world passenger-cargo liners for American President Lines. Included will be pro-

pulsion turbines and gears, turbine generators for lighting, main power switchboards and even searchlights and floodlights. Ships will be built by New York Shipbuilding Corporation, Camden.

* * * * *

BETHLEHEM LOW BIDDER ON ARMY DREDGE

The big army dredge A. MACKENZIE, damaged in the South Pacific, will be repowered, altered, and repaired by a San Francisco Bay yard. Low bidder is Bethlehem.

* * * * *

NAVY EMPLOYMENT AT HIGH LEVEL

Employment at the San Francisco Bay installations of the Navy have passed the 70,000 figure.

* * * * *

H. F. ALEXANDER

It is rumored that Trailerships, Inc. is asking for bids on the two coastwise automobile carriers which have been under contemplation for some time. This is the H. F. Alexander project.

* * * * *

U. S. TANKERS TO BE BUILT IN BRITAIN

The British Information Services advise that shipyards on the north-east coast of England have received a United States order for seven tankers, valued at about $20,000,000. This is one of the largest hard currency contracts ever placed in the United Kingdom.

Three of the vessels will be of 16,500 tons deadweight each, fitted with steam turbine machinery. Four will be of 12,000 tons deadweight each, with Doxford Diesel engines. The vessels will be the latest in tanker design and welding will be largely adopted in their construction.

The order has been placed by the Overseas Tankship Corporation of New York, which is a sea transport subsidiary of the Texas Company and is associated with the Standard Oil Company of California, the California Texas Corporation, and the Bahreins Petroleum Corporation. Arrangements have already been completed under which OTC, which owns some 1,000,000 tons of shipping, will have much of its tonnage dry-docked, repaired, and surveyed in British yards.

Running Lights

California Maritime Academy Commencement

At the commencement exercises of the California Maritime Academy, Vallejo, Cal., on September 4, nineteen young midshipmen making up the 1948 graduating class took the oath of acceptance of commissions in the U. S. Naval Reserve from Fleet Admiral Chester W. Nimitz.

Other prominent guests there to welcome the nineteen graduates were Capt. Henry Blackstone of San Francisco, chairman of the Academy's Board of Governors; Charles L. Wheeler of San Francisco, executive vice president of Pope & Talbot; Dr. Joel A. Burkman of Sacramento, member of the Board of Governors; Dr. Aubrey A. Douglass of Sacramento, Associate State Director of Education; Commodore Norman L. Queen, USN, of Washington, D. C., supervisor of state academies for the U. S. Maritime Commission; Nathaniel F. Main, president of the CMA Alumni Association, and Commodore Russell M. Ihrig, USN (ret.), superintendent of the Academy, who conducted the program and introduced the speakers.

The graduates received degrees of bachelor of nautical science, conferred by Captain Blackstone, and were given licenses as third mate or assistant engineer. Of the nineteen graduates, thirteen were in the engineering group and six in the deck group.

Engineering graduates were: John W. Ball, Earl C. Bowersox, Stuart P. Carney, Jr., Frank R. Cole, William A. Dux, Jr., John W. Gibbs, Stanley E. Harvey, John D. Meyer, Edward S. Olson, Ronald J. Parker, Raymond A. Rowe, Francis L. McCullough and Frederick C. Swain.

Deck group graduates were: Donald E. Buck, Harry R. Christensen, John W. Ford, Bruce T. Johnston, Robert W. Otto and Roscoe S. Wilkey II.

Midshipman S. P. Carney, Jr., receives Naval Reserve Commission from Fleet Admiral Nimitz at California Maritime Academy commencement. Commodore Norman L. Queen, U. S. Maritime Commission, left, presented commissions in U. S. Maritime Service. Captain Henry Blackstone, chairman of Board of Governors, right, presented Bachelor of Science degrees.

Top: Distinguished visitors, left to right: Luther Gibson, Vallejo publisher and member of Board of Governors; Captain Henry Blackstone; Chaplain Cook, invocation and benediction; Commodore Russell M. Ihrig, superintendent of the academy; Fleet Admiral Nimitz; Vice Admiral Tisdale, USN (ret.); Rear Admiral Frank Lowry, Commander, Mare Island-Vallejo area.
Bottom: Distinguished speakers, left to right: Dr. Joel A. Burkman, Assistant Director of State Education; Commodore Queen; Charles L. Wheeler, executive vice president, Pope & Talbot, Inc.; Fleet Admiral Nimitz; Captain Blackstone; Dr. Aubrey Douglass, Associate Director of State Education.

Marine Office Of America

Fred Galbreath at his desk in conference with an associate.

The Marine Office of America was created in New York on March 1, 1919 as the Marine Department of the American Insurance Company, American Eagle Fire Insurance Company, Continental Insurance Company, Fidelity-Phoenix Fire Insurance Company, Firemans Insurance Company, Glens Falls Insurance Company and the Hanover Fire Insurance Company.

In 1930 the Pacific Department was created in San Francisco.

The Marine Office organized its Northwestern Department in Seattle in 1934. There is also a branch in Los Angeles.

The Pacific Department is under the management of Fred Galbreath, and the Assistant Manager, Emmet Cummings. Paul A. Carew is the manager of the Northwest Department in Seattle, and the Los Angeles operations are under the responsibilities of Neil Dunning and Lincoln Walters.

One of the leading underwriters of marine insurance for ship owners and importers and exporters, the Marine Office of America underwrites cargoes and covers the interests of ship owners for both hulls and Protection and Indemnity risks. The United States P. & I. Agency, Inc., which is the service department for ship owners, is established in San Francisco, with Captain Henry Blackstone in charge.

The new offices occupy about 6,000 square feet of office space at 140 Sansome Street, running through to Pine Street. The premises were completely rebuilt and modernized, with modern equipment being installed for every department.

Emmet Cummings at his desk (upper left), and vistas of the beautiful new offices of Marine Office of America.

Meetings of Naval Architects and Marine Engineers

Pacific Coast Section

William Lambie

The first combined meeting of the Pacific Coast sections of the Society of Naval Architects and Marine Engineers was held at the Mare Island Naval Shipyard on October 26. This combined meeting of the Southern California, Northern California and Pacific Northwest Sections brought together leading authorities on many phases of marine architecture and, with a nod toward Navy Day, the visitors to Mare Island were permitted to inspect many phases of Naval Shipyard operation and to see three unreleased moving pictures of Naval warfare. More than 300 were in attendance during the day which started at 9:00 A. M. and continued to 11:00 P. M. The day was divided into Navy Yard inspection, presentation of technical papers and Navy motion pictures.

The four technical papers read during the afternoon session included one by Henry J. Kirschner of Pacific Car and Foundry Company on the history and development in the United States and abroad of cycloidal propellers; a paper by Comdr. H. A. Arnold of Mare Island on German Naval shipbuilding; a paper by Ross Laurensen of the University of California on stability calculations for floating derricks; and a paper by William Lambie on cavitation in connection with marine propellers. An article on cycloidal propellers following up two articles on the subject in May and June 1946 issues of the *Pacific Marine Review* will be published in an early issue as will also a review of Mr. Lambie's paper on cavitation.

(Pictures on page 78)

The ANNUAL SPRING MEETING of the SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS, scheduled for May 1949, will be held in SAN FRANCISCO. An arrangements Committee, headed by Joseph Moore Jr., is being organized.

Northwest Section

The second annual Fall meeting of the Northwest Section of the Society of Naval Architects and Marine Engineers was held at the Gearhart Hotel, Gearhart, Ore., on October 1, 2 and 3, and some eighty members and their ladies from the States of Oregon and Washington and the Province of British Columbia gathered for three days of combined business and pleasure.

Due to the extent of the area in which the members of this Section reside, it is the custom to hold three regular meetings each year in Seattle with the fourth taking place in Oregon under the direction and auspices of the Oregon members. This latter meeting is arranged to combine a technical session with a family gathering and is of three days duration.

The guests assembled on Friday evening at the locale of the meeting in the beach resort of Gearhart on Oregon's beautiful seacoast. A buffet supper was served during the entire evening for the convenience of the visitors as they arrived.

On Saturday morning the golf tournament on the Gearhart Golf Course was followed by luncheon and the Technical Session. Papers presented at this session consisted of "The Development of the Columbia River Gill-Net Boat" by Joseph M. Dyer, member from Astoria, and "The Conversion of Fishery and Hydrographic Exploration Vessel *Spencer F. Baird*" by Harold C. Hanson, member from Seattle. Mr. Hanson's paper is published in this issue. Presentation of the papers was followed by discussion. The Technical Session concluded with the showing of the color film "The Building of the Destroyer" presented by the courtesy of Todd Pacific Dry Docks of Seattle.

The Saturday evening's program commenced with a cocktail party followed by a banquet at 8:00 p.m. Following the banquet was a distribution of the many valuable and handsome golf and door prizes. The evening concluded with the showing of three films, "Down the River of No Return" by courtesy of A. W. Paterson, "This is Oregon" by the Standard Oil Company of California, and "The Modern Mariner" by General Motors Corporation.

Sunday was devoted to the visitors' own personal preferences.

All sessions were presided over by William H. Watkins, Chairman of the Section, while arrangements for the meeting were under the direction of the Convention Committee consisting of Basil A. McLean (Chairman), William L. Williams, Floyd H. Simon, Claude F. Butler and Henry Davies.

Arrangements are completed for the Third Annual Fall Meeting to be held at Gearhart on August 26, 27 and 28 of 1949.

SHOTS OF THE NORTHWEST SECTION MEETING OF THE SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS AT GEARHART, ORE. ▶

From top center, clockwise.

Officers. Left to right: W. H. Watkins, chairman. H. F. Lovejoy, secretary-treasurer. H. C. Hanson, vice chairman. F. G. Greaves, T. M. Rowlands and J. M. Dyer, Board members. (Not in photo, G. J. Ackerman, Board member.)

Committees. Left to right: B. A. McLean, Annual Meeting; P. F. Spaulding, Meetings, F. G. Greaves, Licensing, H. C. Hanson, Model Basin; T. M. Rowlands, Papers; C. F. Butler, Membership.

WHO'S WINNING WHAT? W. L. Williams, R. M. Blasen and Mrs. P. F. Spaulding.

H. C. Hanson, T. M. Rowlands, F. G. Greaves and J. M. Dyer.

Front row, left to right: John Stewart, P. E. Forsythe, R. H. Barnes, H. L. Mathews. Back row, left to right: A. J. Squire, A. W. Paterson, Henry Davies, J. L. Sutherland.

Front row, left to right: G. A. Guins, Paul Marmont, L. W. Johnson, Robert Kelly. Back row, left to right: T. A. McLaren, Thomas White, G. C. Snyder, J. F. Petrich, L. S. Baier

Thomas White, P. E. Forsythe and John Stewart.

J. L. Sutherland, Henry Davies, R. M. Blasen and R. G. Zenen.

L. R. Hussa, B. A. McLean, G. J. Ackerman and W. L. Williams.

Annual Meeting Committee. Left to right: Henry Davies, secretary and general superintendent, Albina Engine & Machine Works; F. H. Simon, maintenance superintendent, Oregon State Highway Commission, B. A. McLean (chairman), principal surveyor, American Bureau of Shipping, Portland, C. F. Butler, Naval Architect, Albina Engine & Machine Works, W. L. Williams, director and manager, American Mail Line, Portland.

Center. Top: Mrs. Richard M. Blasen and Mrs. Joseph M. Dyer.
Bottom: Mrs. Henry Davies and Mrs. J. L. Sutherland.

Naval Architects and Marine Engineers Meeting

(Story on page 76)

Part of the Naval Architects' group during the lunch hour on Mare Island. Over 300 were in attendance at the Navy Yard tour, the luncheon, the technical talks, the dinner, or the Navy's showing of war pictures which rounded out a day that extended from 9 a.m. to 11 p.m. Standing, rear center, at speaker's table is Joseph Moore, Jr.

Lester White of Matson Navigation Co., secretary of Society of Naval Architects and Marine Engineers.

Old Propeller at Mare Island

One of the functions of the propeller shop at Mare Island Naval Station is the reconditioning of damaged propellers. During the war and since there has been a continuous flow of work of this type in which the propellers may be reground, repolished, blades straightened or retipped, new blades attached, or the entire propeller redesigned.

Indicating the kind of damage sometimes incurred, the accompanying photograph set up in the grounds of the Navy Yard shows a propeller that has seen better days. The propeller is from the U.S.S. *Nipsic* and was damaged at Samoa in the hurricane of March 16, 1889.

The *Nipsic* was convoyed to Honolulu for repairs. She returned to the United States from Hawaiian waters and was placed out of commission at the Mare Island Navy Yard October 29, 1890.

This propeller is located in Alden Park at Mare Island Naval Shipyard. The inscription on the tablet reads: Propeller from U.S.S. Nipsic wrecked at Apia, Samoa in the hurricane of 16 March 1889. The propeller is stamped: Washington Navy Yard 1878. Weight—7,900 lbs.

Snapped at Mariners' Club

Fletcher Monson, president of the San Francisco Mariners' Club, chatting with Kenneth Ingram, of the Standard Oil Company, on Standard Oil Day.

Spencer F. Baird

(Continued from page 47)

and the canopy over the bait tanks.

The decks aft were covered with wooden 2" x 6" gratings from rail aft to break of deck forward, for safety and insulation purposes in working on deck.

The refrigeration system consisted of two ammonia compressors placed on a flat in upper aft end of engine room. These were one 3½" x 3½" 4 cyl. machine and one 2 cyl. 3½" x 3½" machine with 10 HP and 5 HP respectively. The condenser and receiver were installed in lower aft end of engine room.

Special deck machinery in the *Baird* included one DMT-10, 30 HP doubledrum trawling winch and one DEV-3, 7½ HP deep sea oceanographic winch, both of which were designed and built by the Markey Machinery Company, of Seattle. There is also one Bathe Thermograph winch for use with the Nansen bottles on deck on starboard side.

The all steel trawling winch is a double drum type with leads direct to ship side. Each of these drums handles 2400 ft. of wire rope for handling of nets and is capable of lifting direct 10,000 lbs. at 60 ft. per minute. There are also two auxiliary drums at top of winch that handle the cargo whips. These handle 150 ft. of ½" wire rope at 125 ft. per minute and can lift 5,000 lbs. The drums have been equipped with automatic cable laying and spooling devices or ferries, also equipped with measuring devices for determining the amount of wire rope in use at any time. The gypsy head has neoprene facing on it to protect the gear. The gypsy head on either side of winch is for purse seine handling. The fore gypsy controls the manila lift line for the handling of the plankton nets; the horizontal roller on top of the winch between the two bitts fairleads the line direct from the plankton net tackle lift block between the two outer boom bands.

This winch is controlled by a 30 HP motor fitted to bed under side of deck, on suitable bed; the gear box handling the sprocket drive has 13 ft. of 1½" sprocket chain. This turns 202 RPM.

The control box was fitted alongside mast on main deck on port side. The grids consisted of six banks of resistors fitted under deck.

The deep sea electric hydrographic or sounding winch has single drums handling 20,000 ft. (6500 meters) of 5/32" cable, turning 0 to 125 revs per minute, with a line speed of 245 ft. per minute; also automatic fairlead for laying and spooling the cable, and it is equipped with a counter to indicate the amount of cable laid out. This winch is set at a suitable angle to allow of direct lead to the hydrographic boom which centers over the working platform hung at outside of gate through bulwarks. Motor is 7½ HP, 850 RPMs, equipped with sprocket chain of 1¼" pitch.

The Louis Wende Co. motor driven Bathe Thermograph Sounding was located on starboard deck with drum of 300 fathoms of standard .021 seven-strand wire leading to all-bronze block. Type C boom fairlead, hung on special davit fastened to boat deck overhead, supports stanchions.

The mast of standard wooden type 16" diameter was installed on deck aft with a five ton boom from which the ordinary wire lift band and 10" steel block was fitted at outer end. Three feet below another band was fitted

(Please turn to page 81)

Westinghouse Sunnyvale Plant Makes Large Turbine

For the first time in the West's history, large turbines are being constructed on a commercial, peace-time basis. This operation, at the Westinghouse Electric Corporation's big plant at Sunnyvale, Calif., is a very elaborate one, involving a great deal of heavy equipment, ranging from huge machine tools to devices which are actually measured in millionths of an inch. All the stages of turbine construction must observe very close tolerances.

Shown in the pictures are close-ups of some of the many operations which go into the manufacture of an efficient, high-speed marine turbine.

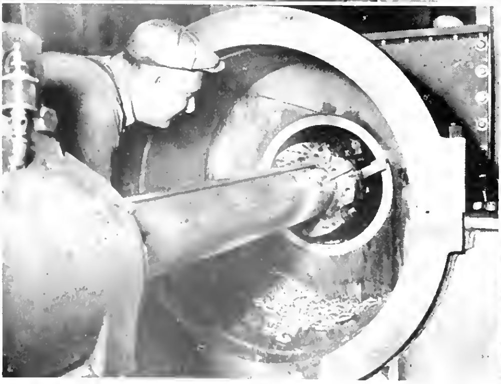
The turbine in the pictures is being built for a new ore carrier on the Great Lakes. The vessel is for the Inland Steel Company, Cleveland, Ohio, and is being constructed by the American Shipbuilding Company, Lorraine, Ohio. It is to be 660 ft. long and 70 ft. wide, and will require a 7700 hp. turbine. Gross tonnage of the ship is to be 12,310 and deadweight tonnage 21,150.

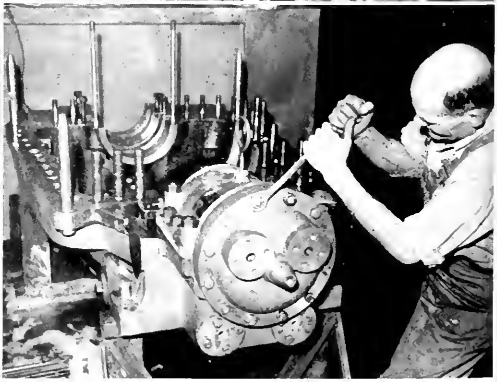
Upper left: One of the most important jobs in the complex operation of making a 7500 h.p. marine turbine is setting in the turbine blades. Here, machinist Elmer Smiley, of the Westinghouse Electric Corporation plant at Sunnyvale, is carefully tapping one of them into place on the low-pressure turbine spindle for a new freighter. The blade was inserted through a slot at the top. When completed, the wheel will have a solid row of blades like the two in the foreground

Lower left: This gear casing and its contents are designed to transmit a lot of horsepower. Shown here is the drilling of one of the large bearings which will support the main gear wheel. At the end of this boring bar, a case-hardened revolving cutting blade slices the steel like cheese. This picture shows the blade pushing a curled-up shaving ahead of the cutting edge, just before it fell off to join the other shavings below. Machinist John Marovich, holding a long-handled oil can, is carefully aiming the stream of oil in front of the blade in order to keep the metal as cool as possible.

Upper right. Two rows of turbine blades have already been installed on the high-pressure spindle. Note, in foreground, the many grooves which have not yet been bladed. Each row has blades of different design and dimensions, to take maximum advantage of each of the various stages of steam pressure. This spindle and the low-pressure one (background), which will be in the same turbine unit, are machined to extremely close tolerances from huge billets of solid steel. Hammer in hand, machinist Chester Sermone is tapping punch holes to indicate the location of pins which hold the final blade in place. This point on the wheel's circumference is the location of the entry slot, through which all the wheel's blades were inserted.

Lower right: The high-pressure turbine chamber must be closed up very tightly, for it will have to withstand approximately 400 pounds inlet steam pressure. Since no gasket can stand the gaff, each half must be machined with microscopic accuracy for a metal-to-metal connection. Since this chamber will house a high-speed turbine, turning about 5,000 revolutions per minute, effective lubrication is vital. Inside the bearing cover, in foreground, oil will be forced under pressure to the heavy journal supporting one end of the turbine spindle. Machinist Fred Geisdorf is tightening the bearing end cover, to make sure that there will be no oil leakage under operating conditions.





Spencer F. Baird

(Continued from page 79)

to which hung a 2500 lb. full load and 1500 lb. surge load accumulator spring to which was attached the 8″ portable sleeve block lead for handling the lift for wire rope for the plankton net lifts. Three feet lower on the boom was another band for handling the topping lift and the tackle block lift under for lifting seine nets and other nets. This leads to roller and over to niggerhead where rope is reefed in.

To provide ample fresh water for extended cruising an evaporator of Kleinschmitt make was installed on starboard side of engine room. This was of 750 gallons daily capacity. It was operated by a system of pumps, three in number, three settling tanks, heater, etc. This was piped so that water would go first to galley tank atop house and so arranged that this would overflow into the water system below. By this means if any contamination should occur, it would be discovered immediately, and there would be no chance for any serious water contamination by failure of evaporator system.

Very little provision was made in the original vessel for the purification of oils, so a No. 65 DeLaval Unimatic Purifier for Diesel oil was installed on starboard side of engine room. This was so arranged along with an ample 550 gallon day tank in fidley space that enough clean oil was on hand at all times in case it was necessary to operate for several hours on this tank, the original day tanks not being large enough for this purpose.

The lube oil purifier of same make and size was also installed on the same flat and arranged to purify the oil that was in the clarifiers. One engine could be down for several hours and the oil cleaned in its system and the same could be done to opposite hand.

The main deck and boat deck as well as the pilot house had awnings fitted over as shown on the plan and crows nest was installed on foremast for the necessary observations for this work. Awning was fitted over this as well.

Another set of davits was installed on port side so that two 24′ power boats could be used in connection with ship's operation.

The special depth recorder, a special Navy NMCI type 24,000 ft. depth, was installed with oscillator blisters at fore part at bottom on starboard side, closely in line with the pilot house. The recorders were installed in the wheel house.

Fire Signal Tag Issued by Paul W. Hiller

At the suggestion of the Port Warden of Los Angeles Harbor, Frank D. Higbee, a fire signal tag has been issued by Paul W. Hiller, 315 Avalon Blvd., Wilmington, Cal. The tag is to be placed on vessels coming into the Los Angeles port and may be tied to the whistle control and kept for emergency. Originally promulgated by the Los Angeles Harbor, and more recently adopted by the Port Wardens Association and many other ports, the signal is becoming international.

The new signal tag, which can be obtained from Paul W. Hiller, reads as follows:

New official FIRE SIGNAL, Los Angeles Ordinance No. 93,366, and as adopted by the American Assn. of Port Authorities, 5 PROLONGED BLASTS, whistle or siren, for fire at a dock, or in a ship not underway. Land equipment, fire boats, and tugs will respond to this signal. It is unlawful to use this signal for other purposes.

G. N. Sieger Elected President Of American Welding Society

The American Welding Society has elected George N. Sieger of Detroit as its president for the year 1948-49. Sieger, President of the S-M-S Corp., Detroit, will direct the activities of the Society, the national technical organization of 7,500 members representing the welding engineering profession, after his installation at the Society's annual meeting at Philadelphia during the week of October 24.

Sieger is a national authority on resistance welding and is a past president of the Resistance Welder Manufacturers Association. During the war he served as chairman of the Task Committee, Resistance Welding Electrodes Advisory Committee and as a member of Task Committee, Resistance Welding Machines Advisory Committee of the War Production Board. He was also a consultant on cemented tungsten carbides for the Cutting Tools Section staff of the Board.

G. N. Sieger

Matson's Montgomery Is General Electric Director

George Granville Montgomery, prominent San Francisco corporation executive, has been elected to the General Electric Company's Board of Directors.

George G. Montgomery

Montgomery, whose primary business is serving as vice president and director of Castle & Cooke, Ltd., sugar factors and shipping agents with headquarters in San Francisco, is a native of Hollister, California. He is vice chairman of the Board of Directors of the Matson Navigation Company; director of Bay and River Navigation Company, California and Hawaiian Sugar Refining Corporation, American Trust Company, Honolulu Oil Corporation, Oceanic Steamship Company and Pacific Guano Company, all of San Francisco; and vice president of Ewa Plantation Company, Kohala Sugar Company, Waialua Agricultural Company and other Hawaiian corporations.

Montgomery was admitted to the California State Bar in 1916 and practiced in Oakland until 1920 with exception of his service as a captain with the 144th field artillery with the A.E.F. during World War I. With Castle & Cooke since 1934, he maintains his headquarters in the company's San Francisco offices in the Matson Building, 215 Market Street.

Ets-Hokin & Galvin Appointed Agent for Crocker Wheeler

Ets-Hokin & Galvan, electricians, with offices in San Francisco, Wilmington, Monterey, Stockton, Newport Beach, San Diego and Oakland, have been appointed as official service station for Crocker-Wheeler apparatus.

Walker, Potts & Miller

A new marine surveying partnership is announced under the above name at 424 Harbor Lane, San Diego. The announcement states that Frank K. Wyatt is no longer associated with the firm but that William C. Miller, who has for a long while been employed by the firm, is now a partner.

K. M. Walker is surveyor for the

Matt Stromberg

American Bureau of Shipping in San Diego and will be recalled as a frequent contributor to the *Pacific Marine Review.*

Butzler Promoted By Hall Laboratories

E. W. Butzler, widely known expert on boiler water conditioning and a member of the staff of Hall Laboratories since their establishment twenty years ago, has been appointed to the new position of business manager of the firm.

Hall Laboratories' parent firm, Hagan Corporation, assigned Butzler as engineering consultant for Hagan and Hall clients in the Pittsburgh area in 1938.

Butzler was for many years right-hand man for Dr. R. E. Hall, director of Hall Laboratories, as an engineering consultant on boiler water problems throughout the United States and Canada.

E. W. Butzler

Stromberg Succeeds Santschi At Nordberg's

Matt Stromberg, who has been Jean Santschi's assistant for many years, has been appointed to succeed him as Manager of the Installation and Service Department of Nordberg Manufacturing Company. Santschi will continue to spend a considerable part of his time with Nordberg in Milwaukee and in the field in a consulting capacity.

Santschi was born in Switzerland and got his first engineering training in that country. In 1904 he went to Belgium while the Diesel engine was in its infancy and he was selected by Usines Carels Freres at Ghent to work in their Experimental and Testing Department under the supervision of Dr. Rudolph Diesel. As a result Santschi practically grew up with the Diesel industry.

In 1914 Carels sent Santschi to the United States to install two 1250 horsepower Diesel engines in a Phelps-Dodge plant in New Mexico, after which he joined Nordberg as Test Engineer for Diesel engines.

In 1925 Santschi was appointed

Jean Santschi

Manager of Installation and Service of Marine and Stationary Diesel engines and other machinery built by Nordberg, the position he held at the time of his retirement.

Incidentally, one of the New Mexico installations was the largest Diesel engine in the United States and it is still in operation.

Fiberglass Corp. Establishes Pacific Coast Division

L. R. Kessler

Establishment of a Pacific Coast Division of Owens-Corning Fiberglas Corporation and the appointment of L. R. Kessler as its general manager were announced recently.

Establishment of the separate division is designed to handle construction, manufacturing, and sales operations of the company in the Pacific Coast area and neighboring western states. All of the research, development, engineering and other departmental services of the company will be made available to the Pacific Coast Division.

Construction of a new Fiberglas plant at Santa Clara, California, is now well under way, and production is scheduled to start there in July 1949.

W. C. Winterhalter was named sales manager of the new division. Working under Mr. Winterhalter's supervision are managers of four West Coast branch sales offices: D. R. Dyas, Los Angeles; H. B. Little II, San Francisco; E. N. Still, Seattle; and J. A. Tallman, Portland. Walter D. Gipe will transfer from his post in Toledo as administrative assistant to Ben S. Wright, Fiberglas general sales manager, to become service manager of the Pacific Coast Division.

The Santa Clara plant will be the fifth U. S. plant operated by Owens-Corning Fiberglas Corporation. Other U.S. plants are located at Newark, Ohio; Ashton, Rhode Island; Huntington, Pennsylvania; Kansas City, Kansas. Through Fiberglas Canada, Ltd., the company operates plants at Oshawa and Sarnia, Ontario.

W. C. Winterhalter

Moran Summarizes Towing Operations

Moran Towing & Transportation Company recently issued a booklet giving details of their towing operations during the past year, and containing many excellent photographs of their tows.

Three hundred ninety-one offshore towing assignments were completed by Moran — 124 being over 500 miles in distance and 53 of them ranging from 1,000 to 12,996 miles —a total of 230,723 miles of deep sea towage. They picked up or delivered tows in many foreign ports. The longest single tows ever undertaken by any towing company were two tin dredges, the largest ever built, which were transported by Moran during the past year all the way from Tampa, Florida, to Banka in the Netherlands East Indies.

In addition to these operations, Moran acted as agent for United States and other governments and private companies for 360 long distance towing assignments, totaling 129,864 miles.

Alden Roach Becomes President Of Columbia Steel

Alden G. Roach, president of Consolidated Western Steel Corporation, has taken on duties as president of Columbia Steel Company, the steel-producing subsidiary of United States Steel Corporation on the Pacific Coast. He succeeds J. Lester Perry, formerly president of Carnegie-Illinois Steel Corporation, who was called out of retirement on May 1, 1947, to assume the presidency of Columbia following the death of its president, William A. Ross. Perry will remain with United States Steel in an advisory capacity.

For the last seven years Roach has been president of Consolidated Steel Corporation which recently became a subsidiary of United States Steel under the new name of Consolidated Western Steel Corporation. Roach will continue as president of Consolidated Western Steel.

A native of St. Louis, Mo., Roach received a B. S. degree in Civil Engineering from the University of Illinois. He worked for several railroads in various capacities and for two years was plant engineer for D. C. Bowman, engineer and contractor in St. Louis. He was also associated with the Union Iron Works in Los Angeles as a contracting engineer for a short period. Roach became associated with Consolidated Steel Corporation in 1929 as contracting manager in charge of the Industrial Building Division. In 1934 he became vice president in charge of Sales and Engineering, was elected a Director of the company in February 1938, and an executive vice president in October 1938. He became president in August 1941.

◀ Alden G. Roach

Flying Stone

Leighton Stone, manager of Swett-Stone Co., San Francisco, is back in San Francisco after a flying tour of a number of his Eastern plants. He found production facilities extremely busy, and after conferences with engineering and research departments, reports several important product improvements in the offing.

In Connecticut, Stone visited American Instrument, Consolidated Safety Valve, and the modern new Ashcroft Gauge plant at Meriden. He also attended a filter conference at Cuno Engineering. In Boston he saw the Hancock Valve people, and in Chicago, Ilg Electric Ventilating Co. He returned home via the Marshaltown, Iowa, plant of Fisher Governor.

Maintenance Allowed for Seaman's Frolic

(Continued from page 61)

business. Men cannot live for long cooped up aboard ship, without substantial impairment of their efficiency, if not also serious danger to discipline. Relaxation beyond the confines of the ship is necessary if the work is to go on, more, so that it may move smoothly. No master would take a crew to sea if he could not grant shore leave, and no crew would be taken if it could never obtain it. Even more for the seaman than for the landsman, therefore, 'the superfluous is the necessary***to make life livable' and to get work done. In short, shore leave is an elemental necessity in the sailing of ships, a part of the business as old as the art, not merely a personal diversion.

"The voyage creates not only the need for relaxation ashore, but the necessity that it be satisfied in distant and unfamiliar ports. If, in those surroundings, the seaman, without disqualifying misconduct, contracts disease or incurs injury, it is because of the voyage, the shipowner's business. That business has separated him from his usual places of association. By adding this separation to the restrictions of living as well as working aboard, it forges dual and unique compulsions for seeking relief wherever it may be found. In sum, it is the ship's business which subjects the seaman to the risks attending hours of relaxation in strange surroundings. Accordingly, it is but reasonable that the business extend the same protections against injury from them as it gives for other risks of the employment."

The court held that the theory of the Aguilar case was sound and that the libelant in this case should recover. The court said that denial of maintenance and cure "is consonant neither with the liberality which courts of admiralty traditionally have displayed to seamen, who are their wards, nor the dictates of sound maritime policy." On the question of whether the diving was misconduct or gross negligence, the court said that no evidence was available to show a skillful diver could not have safely negotiated the dive in the four feet of water in the pool.

Unfortunately, again the decree of the District Court was reversed.

Noon Fixes by Unusual Methods

(Continued from page 65)

tion. This correction is to be *added* if your difference of latitude is toward the sun and *subtracted* if it is away from the sun.

These two methods of using the sun to determine the noon position are the uncommon rather than the common ways and surely are not new ways. For most of the time they will not only be impractical but often it will be impossible to use, them, this depending upon the position of the observer and the sun. Their accuracy in this writer's opinion is greater than that of advancing the morning sun line or star sights. Then, too, there is always the possibility that due to weather conditions, a fix by morning stars or a morning sun line is not available. With these methods, if conditions are right, you still will be able to determine your vessel's position at noon.

They are worth keeping in the back of your mind, if for no other reason than broadening your knowledge of the subject. It's always wise to have a trick or two up your sleeve for special occasions.

Thomas B. Stillman of B & W Dies

Thomas B. Stillman, aged 58, Engineering Consultant for The Babcock & Wilcox Company, and internationally known authority in the field of fuel-oil burning and marine boiler design, died suddenly on September 28 in Philadelphia while enroute to the Naval Boiler and Turbine Laboratory at the Philadelphia Navy Yard.

Mr. Stillman made many significant contributions to the development of modern boilers and fuel-oil burning equipment in naval and merchant vessels, holding more than 25 patents relating to boilers, superheaters, oil burners and economizers. In the field of oil burning equipment he was regarded as one of the world's outstanding authorities. He was the author of many technical papers in the field of oil burners and marine boilers.

Book Review

THE SHIPBUILDING BUSINESS IN THE UNITED STATES OF AMERICA, sponsored by the Society of Naval Architects and Marine Engineers. Price $12.50.

Under the guidance of a Control Committee of members of the Society and an experienced editor, a competent technical staff of thirty authors, well known in the industry, has assembled into two compact volumes a comprehensive work on the history, organization and operation of shipbuilding.

This two-volume publication presents in a non-technical but practical style authoritative material on the many business problems which must be solved economically and promptly in the building and repairing of ships. Among the subjects covered are chapters on cost estimating; production and material control; proposals and contracts; planning, designing and scheduling; procurement and storekeeping; costkeeping and accounting; management controls; marine insurance; inspection; wage systems; shipyard layout and organization; labor; economics and shipbuilding; statistics; history.

New Chart

Publication of new nautical chart 9130 covering Alaid and Nizki Islands of the Semichi Group in the Aleutians has been announced by Rear Admiral Leo Otis Colbert, Director, U. S. Coast and Geodetic Survey, Department of Commerce.

The new chart, together with chart 9125 published in 1947, provides large-scale coverage at 1:20,000 of the Semichi Islands. These new charts of the waters near the end of the Aleutian Chain are available for those vessels that use the shorter and better weather great circle route to the Orient from Pacific Coast ports of the United States.

Chart 9130 was compiled from modern hydrographic and topographic surveys by the Coast and Geodetic Survey. Details appearing on the chart are presented in conformance with the new symbolization recently adopted for nautical charting by the Coast and Geodetic Survey. Relief of land areas is indicated by contours at 100-foot intervals. The blue water tint is carried to the 5-fathom curve.

Chart 9130 measures 34 by 42 inches and is distributed at 75 cents per copy by the sales agents, district offices, and the Washington office of the Coast and Geodetic Survey.

Book Review

THE STORY OF THE SHIP, by Charles E. Gibson, published by Henry Schuman, Inc. Price $4.00; 244 pages.

Here in untechnical language is the story of the evolution of the ship from the first crude raft to the magnificent steamships of today, a book which will be of special interest to the seaman and layman alike. It is a story about the ship and the reasons for its being, the social and economic conditions which resulted in its design and development, a simple and fascinating history of how man has built the ship to meet his needs.

The author is a layman who has known ships intimately as a lieutenant in His Majesty's Navy during World War II, and has followed his insatiable thirst for full knowledge about every aspect of ships and shipping. Their history, he says, is "the life of a science and art, for the building and sailing of ships is both."

There is romance in this story of the ship as related to man's economic, technological and cultural growth.

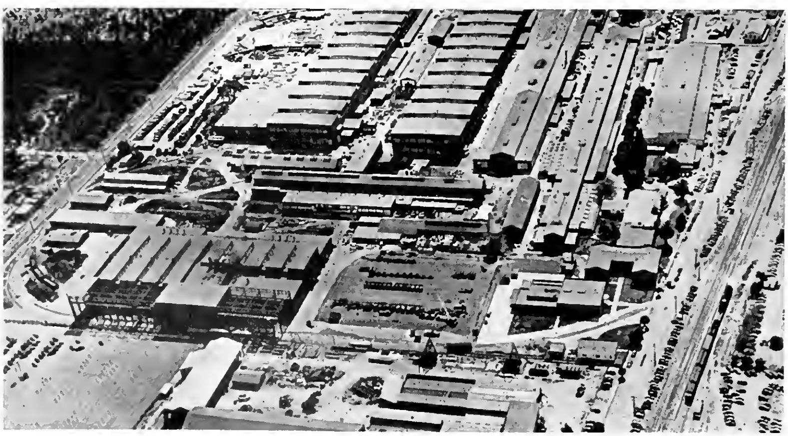
Westinghouse To Buy Hendy Plant

The Westinghouse Electric Corporation through R. A. Neal, vice president, has announced its decision to purchase the 57-acre Sunnyvale, California, Works which was leased from the Joshua Hendy Iron Works. Westinghouse assumed operation of the plant as of March 1, 1947, under terms of a 10-year lease with the option to purchase by November 1, 1948.

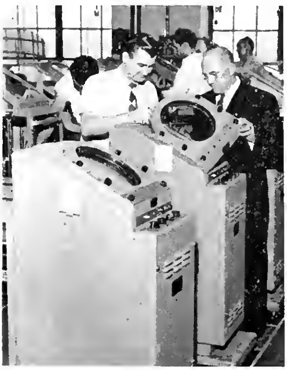
This move is indicative of the company's confidence in the business and industrial future of the west. Already the company has invested several million dollars in machinery and equipment, and facilities are continually being expanded to meet the needs of western industries and electric utilities and to produce equipment for export purposes.

The plant is already in rapid production on distribution and power transformers, alternating-current motors, steam turbines up to 12,500 kilowatts generating capacity, voltage regulators, valves, large air moving equipment, gears, switchgear, and other products.

The Sunnyvale Works is a major unit in the nation-wide chain operated by the company's Manufacturing & Repair Division.



Aerial photograph of the Sunnyvale plant which Westinghouse Electric Corporation is purchasing.



Hugh A. Saul (right foreground), Vice President in charge of production of Radiomarine Corporation of America, examines one of the RCA 3.2-centimeter radars earmarked for installation aboard a U. S. Army Transport Service ship, as he and William B. Medvesky, production foreman of Radiomarine, inspect the production line.

217 RCA Radars For Signal Corps

Purchase by the U. S. Signal Corps of 217 commercial-type marine radar units, valued at more than $2,000,000, was announced by Walter A. Buck, President of the Radiomarine Corporation of America.

Scheduled for installation aboard ships of the U. S. Army Transport Service, the units consist of the latest surface-search 3.2-centimeter commercial radars, and represent one of the largest single radar orders received by Radiomarine to date. Other government sales have included units to the U. S. Coast Guard, Army Corps of Engineers and the U. S. Navy.

Booklet on Pumps Prepared by Kinney

The Kinney Manufacturing Company, Boston, recently prepared an illustrated booklet on their Kinney Rotary Liquid Pumps. The booklet also contains information about rotating plunger pumps, pump drives, Heliquad pumps, strainers, and other Kinney products. Pumping data conversion tables and many other tables containing valuable information on pumps are included. There are photographs and drawings on each subject covered.

New Carrier Vice-President

Election of George N. Lilygren as a vice president of Carrier Corporation, Syracuse, N. Y., leading manufacturer of air conditioning and refrigeration equipment, is announced by Cloud Wampler, president. Lilygren was appointed comptroller of Carrier Corporation in June 1947, and will now serve as vice president and comptroller.

Prior to his association with Carrier Corporation, Lilygren had broad experience in factory engineering work as well as factory accounting. He formerly was assistant comptroller of Briggs Manufacturing Company, Detroit.

Erikson Elected President of Hagan; Boho Now Vice-President

D. J. Erikson

D. J. Erikson has been elected president of Hagan and its subsidiary companies—Calgon, Inc., Hall Laboratories, Inc., and Buromin Company—to succeed J. M. Hopwood who has been president of Hagan Corporation since 1918. Hopwood has been elected chairman of the board of directors of the Hagan group.

Erikson began his career with Hagan Corporation more than thirty years ago as a draftsman. He went from drafting to field service and then into sales work following a short period in military service in 1917-18. He helped to establish Hagan's New York office in 1920 as a service engineer, returning to Pittsburgh headquarters of the firm in 1922. He was appointed sales manager in 1927.

Erikson then went into his work of making the chemical product, Calgon, a special phosphate glass material widely applicable in water-conditioning for industry, business and household.

In 1939 he was elected vice president in charge of sales. This position has now been taken over by M. J. Boho who joined Hagan as a field service engineer in 1936, after serving as a research engineer in private industry and with the Potomac Electric Power Company in Washington, D. C. Boho was transferred to Hagan's New Projects Division in 1938, where he was engaged in the development, design and application of automatic combustion controls for steel industry use. He was appointed assistant general manager of sales in 1945.

Boho played an important part in the designing, installation and adjustment of Hagan automatic combustion controls in many of the largest steel and utility power plants in the United States and Canada before World War II. He is particularly well known in the steel industry for his engineering work in the field of automatic

control of soaking pits—special furnaces which represent a crucial step in the making of steel to meet strength and ductility requirements.

M. J. Boho

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946.

Of PACIFIC MARINE REVIEW, published monthly at San Francisco, California, for September 8, 1948, State of California, County of San Francisco.

Before me, a Notary in and for the State and county aforesaid, personally appeared B. N. DeROCHIE, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the PACIFIC MARINE REVIEW, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Acts of March 3, 1933 and July 2, 1946, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, JAMES S. HINES PUBLISHING COMPANY, 500 Sansome St., San Francisco 11.

Editor, T. DOUGLAS MacMULLEN, 500 Sansome St., San Francisco 11.

Business Manager, B. N. DeROCHIE, 500 Sansome St , San Francisco 11.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

JAMES S. HINES, 500 Sansome St , San Francisco 11
MARY G. HINES, 500 Sansome St., San Francisco 11.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

B. N. DeROCHIE (Signed)
Business Manager.

Sworn to and subscribed before me this 8th day of September, 1948

EDITH GOEWEY

(SEAL) Notary Public in and for the City and County of San Francisco, State of California.

(My commission expires December 24, 1948)

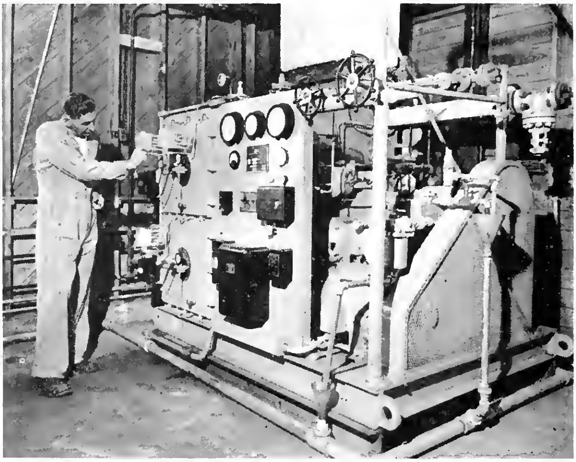
Merrill-Stevens Installs New Boiler

With the recent installation of a Besler High Pressure Test Boiler, Merrill-Stevens Dry Dock & Repair Company, with main yards in Jacksonville, Florida, continues its expansion program to keep step with advance methods of ship repair work.

The new boiler, believed to be the first ever installed in the South Atlantic and Gulf area, is capable of producing steam of 1,500 pounds pressure per sq. in. at a temperature of 900 degrees in only two minutes, starting from zero.

Officials of Merrill-Stevens believe this installation a great step forward as it is designed to save ship owners and operators thousands of dollars through expediting ship repair work. The steam, generated so quickly in this boiler, is used to test safety valves, regulating and reducing valves, pumps, turbines and gauges. Formerly these had to be tested aboard ship, using ship's steam. When ship's plants were cold for other repairs, there was a delay in the testing operations. With the new Besler steam generator a part can be brought to the Merrill-Stevens' laboratory and tested in two minutes.

Merrill-Stevens has grown from a small marine blacksmith shop 75 years ago to one of the South's largest ship repair firms. Since Pearl Harbor, more than a thousand vessels of all types have been serviced by the company.



Besler High Pressure Test Boiler. W. E. Cole, Jr. of Merrill-Stevens is shown adjusting the fuel feed to one of the burners.

George Swett Resumes With Yorcalbro Tubes

The Yorcalbro Aluminum Brass Condenser Tubes which were so well accepted in the marine and industrial fields before the war are again available through George E. Swett & Co., Engineers, San Francisco.

These tubes were first installed on famous ships registered in San Francisco a number of years before the war started, and these installations are still in service requiring only a negligible percentage of tube replacements over the years.

The serviceability of the Yorcalbro Tubes is not confined to marine condensers alone. They can be supplied for all forms of heat exchangers on board ship in which salt water comes into contact with the tubes, as, for example, in auxiliary condensers, air or oil coolers, compressor inter-coolers, salt water calorifiers and drain coolers. Another use is for sea-water mains and pipe lines.

S. F. Propeller Club

MATSON TABLES, PROPELLER CLUB, OCTOBER MEETING
Left to right: Captain William Meyer; Terry Rowe, Castle & Cook; Captain H. R. Gellespie, marine manager; Joseph B. Hurd, Alexander & Baldwin; A. J. Pessel, public relations manager; H. B. Perrin, secretary; Captain M. C. Stone, port captain; A. J. Haring, service manager.

Frank Foisie, speaker, and Louis Lapham, president of the San Francisco Propeller Club, taken at the October meeting in the St. Francis Hotel. Foisie reviewed the maritime strike situation, and the club voted endorsement.

Snapped at the Propeller Club, clockwise from 7 o'clock: George Barr, Joe Moore, Jr., A. Bockfeldt-Svendsen, Roy Folger, Joe Moore, Sr., Ralph Myers, Phil Coxon, George Crow.

KOMUL is a well-proved coating for marine service. Application to damp surfaces first recommended it for use in spaces subject to condensation of moisture. Its continuous film and resistance to chemicals recommended it for use on steel decks under magnesite. Simplicity of application has made marine men want it for hard-to-get-at spaces.

Technically, KOMUL is an irreversible emulsion of coal-tar-pitch, retaining all the protective characteristics of pitch in an easily-used form.

An illustrated folder and a sample on a steel panel . . . for the asking. The panel you can twist or bend as you will and you can dig at the coating to prove KOMUL's adhesion and toughness.

SELBY, BATTERSBY & COMPANY

5235 Whitby Avenue, PHILADELPHIA 43, PA.

J. H. CORDES — 34 Davis Street, San Francisco 11, Calif.

J. M. COSTELLO SUPPLY CO. — 221 N. Avalon Blvd., Wilmington, Calif.

GRACE LINE

"SANTA FLEET"

SERVES LATIN AMERICAS

S. S. SANTA ADELA
S. S. SANTA JUANA
S. S. SANTA FLAVIA
S. S. SANTA LEONOR

These C-2 fast freight vessels, equipped with refrigerator space, and limited passenger accommodations, together with modern chartered tonnage, supply frequent service between —

BRITISH COLUMBIA — WASHINGTON — OREGON — CALIFORNIA

and

Mexico — Central America — Panama — Colombia — Ecuador — Peru — Bolivia — Chile

SEATTLE
White Building
SEneca 4300

SAN FRANCISCO
2 Pine Street
SUtter 1-3800

LOS ANGELES
523 W. Sixth
MIchigan 7811

VANCOUVER
991 Hastings St., W.
PAcific 7271

PORTLAND
738 Mead Bldg.
CApitol 1013

GENERAL MACHINE and REPAIR WORK

Representatives for

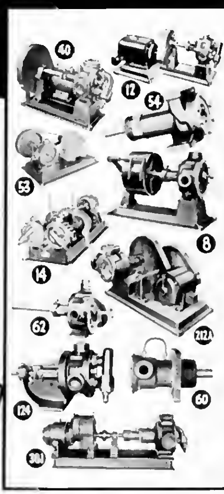
TODD COMBUSTION EQUIPMENT, INC.
(TODD OIL BURNERS)

COLUMBIA MACHINE WORKS

L. K. Siversen, Owner

THornwall 3-1636 — BERKELEY, CALIF. — 7th and Carlton St.

What will YOU have from the complete VIKING LINE of ROTARY PUMPS?



Viking is a specialist in Rotary Pumps of sizes from 2/3 to 1050 gpm, pressures to 200 psi — 500 psi on hydraulic oils.

Send for free bulletin 47SU today!

Samples of VIKING ROTARY PUMPS

See Our Catalog in SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa

PACIFIC COAST DISTRIBUTORS

E. E. BURTON — 4432 Long Beach Ave., L.A. 11

DE LAVAL PACIFIC COMPANY — 61 Beale Street, San Francisco

KEEP POSTED

New Equipment and Literature for Yard, Ship and Dock

Magnetic Compass Pilot

Based upon the favorable results obtained in a diversified test program, Sperry Gyroscope Company announces production plans for a Magnetic Compass Pilot. Developed since the war and experimented with for many months aboard a score of ocean fishing craft, river towboats, tugs and yachts, the new device has proven a welcome means for automatic steering of small and intermediate size craft through a magnetic compass.

With final production designs approved, Sperry is in hopes of beginning deliveries well before the end of the first half of next year. Simple and easy to operate, the equipment consists of a course setting knob and course indicator attached to the top of a high-quality standard magnetic compass. When a course is "dialed" by means of the course setting knob, the boat turns to the new course and holds it automatically until a new course is chosen. A pickoff senses the compass reading and applies rudder through a power unit or steering engine.

Test installations have been made on craft ranging from a 40-foot cruiser to large river towboats. To fit the particular needs of small and medium size craft, Sperry can provide a power unit or steering engine to meet any requirements up to 17,000 pounds steering cable pull. The pilot requires little power, using either 32-volt or 110-volt DC.

A utility accessory to the magnetic compass pilot is a remote steering controller. It is a small, hand-held control with a flexible cable which permits rudder changes to be made from any point on deck away from the helm.

Improved T-Square

The new "Instrumaster" T-Square, recently placed on the market by Instrumaster Industries, Chicago, is molded in one integral piece of shatterproof plastic, and remains 100% accurate *even if dropped*. The clear plastic permits full visibility of the surface on which the T-Square is placed, providing an unobstructed view of the whole area. Both sides of the T-Square are equally usable, offering greater convenience and longer life. The ribs, which are protruded .020 above and below, enable the T-Square to be moved across the working surface more smoothly. In addition, users drawing with ink do not have to be concerned about smearing the writing fluid.

T-Square

The "Instrumaster" T-Square is available in two blade lengths, 18″ and 24″.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

.... issue. Page No. ....

....

....

....

(Identify by name of manufacturer and catalog)

NAME..

BUSINESS..

ADDRESS...

....

GENERAL VOYAGE REPAIRS
EVERY TYPE OF MACHINE WORK

FOR VESSELS DOCKING AT LOS ANGELES HARBOR

Complete Welding Facilities

CAVANAUGH MACHINE WORKS

FRANK CAVANAUGH - GENERAL MANAGER

220 East B Street, WILMINGTON, CALIFORNIA — Phones: TErminal 4-5219, TErminal 4-5210

MARINE SPECIALTIES

ALLENITE SOOT ERADICATOR
ALLENCOTE REFRACTORY COATING
BUTTERWORTH TANK CLEANING SYSTEM
COFFIN PUMPS
FLEXITALLIC GASKETS
FRANCE METALLIC PACKING
KOMUL ANTI-CORROSIVE COATING
LESLIE REGULATORS & TYFON WHISTLES
MULSIVEX, OIL & GREASE REMOVER
SANDUSKY CENTRIFUGAL CAST LINERS
SCALETEX, WATER SCALE REMOVER
SEA-RO PACKING

CORDES BROS.

4 Davis St. — San Francisco 11, Calif. — GArfield 1-8355

HOUGH & EGBERT CO.

311 CALIFORNIA ST. • DOuglas 2-1860 • SAN FRANCISCO

Representing

WALTER KIDDE & COMPANY, INC.

Rich Smoke Detecting System
Lux Fire Extinguishing System
Selex-zonit Fire Detection System

AMERICAN ENGINEERING COMPANY

Steering Gears • Deck Machinery
Vapor Car Heating Company Service
HOUGH Patent Boiler Feed Checks • LANE Life Boats
SCHAT Davits

CONSULTING ENGINEERS ● MARINE SURVEYORS
SURVEYORS TO BUREAU VERITAS
MARINE DISTRIBUTORS FOR *SHEROLITE* PRODUCTS
FOR NAT-LEA-KENNEDY ASSOCIATES

SHIP REPAIRS—CONVERSIONS

MAIN 3122 24 - Hour Service

Three Plants in Which to Serve You
PIER 66, SEATTLE 1,
WINSLOW and TACOMA, Washington

NO JOB TOO SMALL — NO JOB TOO BIG

COMMERCIAL SHIP REPAIR

J. J. Featherstone — E. A. Black

The Isherwood Systems of Ship Construction

There is an Isherwood System for every type of mercantile vessel . . . .

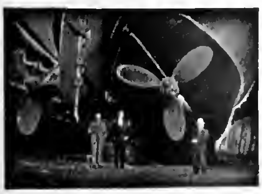
Eminently suitable for Oil Tankers . . . .

Designers and Specialists in Hull Construction and Reconversions . . . .

SIR JOSEPH W. ISHERWOOD & CO.
LIMITED

4 Lloyds Ave., London E.C.3 — 17 Battery Place, New York

Propeller Design



- Save Fuel
- Increase Speed
- Eliminate Vibration

Send us your problems . . . we specialize in propeller design.

WILLIAM LAMBIE, Naval Architect
216 East C Street — Wilmington, California

LAMBIE PROPELLERS

Manufacturers of

WATERTIGHT FIXTURES AND FITTINGS

Ask for Our Catalog No. 3

Edison G. E. Appliance Company

MARINE ELECTRIC CO.

195 FREMONT STREET • SAN FRANCISCO, CALIFORNIA

Telephone EXbrook 2-6312 — Established 1886

Bethlehem Steel's Show

Production of a new color motion picture portraying the vital role steel is playing in the growth of western industries is announced by Bethlehem Pacific Coast Steel Corporation. This film, which will be institutional in type, is expected to be completed around the first of the year. Following a fast moving pace, it will show interesting and unusual applications of differenr types of steel in the logging and lumbering industries; manufacturing; agriculture; oil drilling and refining; mining; the garment industry; and the fabrication and erection of steel framed buildings, bridges and other large construction projects. Steelmaking and processing scenes will be taken in Bethlehem Pacific steel plants and fabricating works located in Seattle, South San Francisco, Alameda, and Los Angeles.

The motion picture, which is being produced by New World Productions of Hollywood, will be available to industry, schools, colleges, clubs, and organized groups.

Cunningham Air Whistles Folder

The Cunningham Manufacturing Company, Seattle, have available a small folder on their Cunningham Air Whistles. The whistles are made of cast bronze in six different sizes or diameter of diaphragm. The larger sizes are made in two lengths of horn and the smaller sizes in three lengths.

Cunningham Air Whistles are available through all marine dealers.

Nordberg Announces New Bulletins

The Nordberg two-cycle Duafuel engine is described and pictured in a new bulletin, "Nordberg Gas Burning Diesels," published by Nordberg Manufacturing Company, Milwaukee.

The Duafuel engine is quickly convertible to either oil or natural gas fuel without changing pistons, heads, cylinders or orher major parts. This dual fuel engine operates on the full Diesel principle when burning either gas or fuel oil, whichever is the most economical. The Bulletin contains a five-color drawing of the schematic arrangement of gas details and piping of Nordberg Duafuel Diesel engines. Also shown are several installation pictures.

Copies of this bulletin, No. 106-A, may be had upon request.

Nordberg Manufacturing Company announces publication of Bulletin 143B on Gasoline Marine Engines and Reduction Gears. This eight-page two-color bulletin gives features, specifications, design and construction of the three basic models of Nordberg Gasoline Marine Engines which are available for direct drive or reduction gear drive in ratios of 1.88, 2.44, 3.22 and 4.12 to 1. Two pages are devoted to cross-section drawings of the engine and the reverse and reduction gears. The bulletin also contains a chart of brake horsepower ratings at both engine and propeller RPM for direct and reduction gear drive.

Copies of Bulletin 143B may be had free on request to the Gasoline Marine Engine Dept., Nordberg Mfg. Co., Milwaukee 7, Wis.

Heat-Resisting Sealing Compound

A new heat-resisting sealing compound, Stabond C-875, has been added by the American Latex Products Corporation to its line of Stabond cements, adhesives and allied compounds.

Stabond C-875 is a resin based material, suitable for filleting or caulking, which retains its adhesive and sealing properties at temperatures as high as 500° F. Its adhesion to aluminum, brass, tin, steel, micarta, lucite, fiberglas, wool and stainless steel is satisfactory at all temperatures between minus 65° F. and 500° F. It will meet aircraft standards for low temperature flexibility, and for vibration resistance throughout its entire operating range.

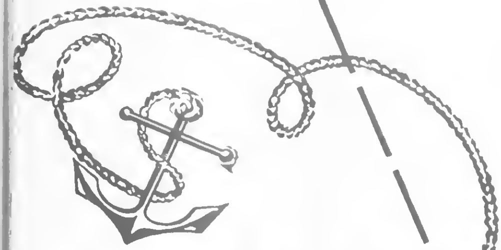
Corrosion Test Strip Described

Randall and Sons, chemical engineers, Berkeley, Cal., describe, in their information circulars Numbers 1 and 3, the use of their step-plated bearing corrosion test strip to determine the onset of bearing corrosive characteristics in crank case oils during use.

The corrosiveness is measured by reading the number of steps of lead plate removed when a sample of the used oil is stirred with the strip for one hour in a heated cup. The tendency to form "varnish," if any, is also revealed in the test. Regular routine tests of the existent corrosivity by the engine room crew will insure maximum useful life of bearings and lubricants.

Pacific Marine Review

DECEMBER, 1948



A CENTURY IS A LONG, LONG TIME!
No, we haven't quite reached the century mark. The original Tubbs Cordage plant was started in 1856 so we're only 92 years old.
But in nearly a century of operation, we've learned a lot about rope making. So much so that today rope with the Tubbs trademark is the accepted leader in the West.
In the marine field, you'll find Tubbs Extra Superior Manila to be an exceptionally fine product—a rope that will give you extra wear, safety and service. Specify it to your supplier for plus values in rope.
For mooring and tow lines, specify SUPERCORE—the outstanding leader in the marine field.
TUBBS
Cordage Company
San Francisco
Portland
Los Angeles
Seattle
Chicago
New York
TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY

Pacific MARINE REVIEW

. S. HINES
Publisher

. N. DeROCHIE
Assistant Publisher

. DOUGLAS MacMULLEN
Editor

AUL FAULKNER
Advertising Manager

. N. DeROCHIE, Jr.
Sales Promotion Manager

OROTHY GRAVES
Assistant to Editor

AVID J. DeROCHIE
Los Angeles Advertising-Publicity

LOS ANGELES OFFICE
53 Wilshire Blvd., Beverly Hills
lephone—BRadshaw 2-6049

SAN FRANCISCO
Telephone—GArfield 1-4760

ific Marine Review is indexed
larly by Engineering Index,
c

MEMBER AUDIT BUREAU OF CIRCULATIONS

bscription rates:

e year, $2.00; two years, 50; three years, $5.00; foren, $1.00 additional per year; le copies, 25c.

TABLE OF CONTENTS - - - - - - - - DECEMBER, 1948

PUBLISHED AT 500 SANSOME STREET • SAN FRANCISCO 11, CALIFORNIA

Take Away That Baby's Bottle?

THE REMARKABLE PLAN of ECA's Paul Hoffman to use American ships for Marshall Plan bulk commodities *only when necessary* has brought the industry up fighting. The Hoffman ruling does not seem to have been well thought out; nor could it have been made with a full appreciation of the tortuous route our shipping has followed during the last quarter century, especially since the beginning of the war.

There is more to shipping than mere transportation, and Hoffman with his global eye should know it. His use of American ships when fast, reliable service was needed, and when cheaper foreign tramps were not available, is in seeming disregard of our present policy of building up the Merchant Marine in the interests of our domestic economy, world equilibrium, and national defense. He reminds of Milton's

"—at one gate to make defense
And at another to let in the foe".

An important objective of any foe could well be the further disruption of shipping, which has an important place in the day-to-day welfare of 10,000,000 American families. It is time that the cotton population of the South, the agricultural population of the West, and the industrial population of the North and East, Mr. Hoffman, joined with the exporters and importers, the ship builders and seafarers in a realization that shipping is their livelihood as well as their defense, and that American babies must eat while soldiers fight and relief cargoes sail.

The historical backdrop reminds us that the Merchant Marine Act of 1936 was intended to put shipping on a reasonably competitive basis with foreign operators. The program was getting well under way when war broke out and all of the ships were taken over by the government. Many of them were lost, and all had to be replaced or reconverted to peacetime operations, making shipping among the last of industries to be restored to its owners. Many lines are still unrestored.

The Ship Sales Act of 1946 not only set up unrealistic prices for replacement ships but permitted sales to foreign operators, and these latter ships are among those to which Mr. Hoffman now looks for the undermining of American freight rates.

Shipping associations have jumped into this fight with admirable promptness, and they seem to have the backing of Congressional members who required the 50-50 allocation in the European Recovery Act. Fifty-fifty seems a very modest protection for American interests and is giving away to relief countries far more in the shape of shipping opportunities than they can get in other industries. In order to save on the cost of relief, we do not invite Europeans to operate our mines, farms and railroads, and it would not be unrealistic to require that *all* instead of 50% should go in American ships.

AN ESSO SUPERTANKER

Better Than 1000 Tank Cars

Tankers

FROM THE STANDPOINT of Naval architecture, the oil companies and tanker operators of the United States are talking a bold step. They have designed and ordered 60-odd tankers of giant proportions, 56 of which are nearly double the tonnage of the T-2's 16,000 deadweight. As of November 8, the score stood at

35	26,000 tons
13	28,000 tons
5	30,000 tons
3	32,000 tons

Dimensions of the T-2 are: Length 528′, Beam 68′. Those of the new types run:

	Length	*Beam*
26,000 tons	600′	82′6″
28,000 tons	595′	84′
30,000 tons	615′	84′
32,000 tons	625′	85′

And tests were completed last month at the Stevens Towing Tank on the model of a 720 foot vessel with a beam of 108 feet.

Some idea of the capacity of these great ships will be gained from the estimate that one 26,000-ton ship will carry enough oil to fill 1,000 tank cars, or a train eight miles long.

When it is realized that a tanker is a distinct type of vessel, with conditions of stability and displacement in a different category than those of other types, the doubling of the deadweight and greatly increasing the overall dimensions on a great fleet of ships prior to the completion of any of them, indicates long range vision and adventurous designing.

But emergencies often bring their own solutions, and the realization of the importance of petroleum in world economy has forced drastic measures. It was as late as October of last year that T-2s were exceeded in number in the reserve fleets only by Libertys. By February of this year the number in reserve had dropped to six, and by June all had been taken.

This situation, in which conservative oil companies suddenly go all out for a new program, invites attention to the causes.

The Arabian American Oil Company has published a well-illustrated brochure on world oil needs in which it is shown that the United States has consistently supplied between 60 and 70 per cent of the world's needs. But U. S. demand and world demand are increasing at a tremendous rate. It seems generally agreed that the interests of security and world peace demand the restoration and improvement of the war-torn economy of Western Europe and a sufficient supply of oil products is essential to that end. The ability of the United States to export to Europe has about been exhausted. Our expanding industrial production, increasing automobile and truck operation, conversion of railroads to oil fuel, and the needs of aviation and the merchant marine are but suggestive of our own needs. The eastern hemisphere must supply its own petroleum; and pipe lines and tankers with every possible short cut to delivery are the answer.

The Ships

Of the 56 vessels of the giant types now on order, Sun Shipbuilding & Dry Dock Company has thirteen of the 26,000 tonners and Newport News Shipbuilding & Dry Dock Company has eleven. Bethlehem Steel Company, Quincy and Sparrows Point yards, has a total of 24, of 26,000 and 28,000 tons. Welding Shipyards, Inc., has five of 30,000 tons and New York Shipbuilding Corporation has three of 32,000 tons.

The overall design of these ships does not vary greatly from that of the three-house profile common on smaller vessels, but the equipment does vary considerably—from builder to builder and from owner to owner.

In this connection there was read at the recent annual meeting in New York of the Society of Naval Architects and Marine Engineers, a splendid paper on modern tankers, by Harold F. Robinson, Chief Naval Architect, Bethlehem Steel Company, Shipbuilding Division, Quincy, Mass., John F. Roeske, Assistant Naval Architect, Sun Shipbuilding & Dry Dock Company, Chester, Pa., and A. S. Thaeler, Assistant Marine Engineer, Pittsburgh Steamship Company, Cleveland, O., formerly Assistant and Acting Chief Engineer, Federal Shipbuilding and Dry Dock Company, Kearny, N. J. In the appendix to this paper they present the characteristics of 37 tankers by name, which are representative of nearly 800 seagoing tankers built since 1936, and the 26,000, 28,000 and 30,000 ton types now under construction are included. These tables are published herewith, with the observation that they constitute a very valuable compilation of data on the tanker building art which it is important that the industry have readily available. The tables are on pages 38 to 42. The T-2 characteristics will be recognized under the typical *Esso Gettysburg*. Also reprinted from the "Modern Tanker" paper are graphs showing variations of operating cost and cargo carrying

(Please turn to page 42)

The big tanker program is developing so fast, and has so many variations, that it is not possible to condense the entire story into this one issue as planned. Additional tanker plans and feature articles will follow from month to month. We expect to take these big jobs one by one and publish comprehensive details. Especially noteworthy in the January issue will be a discussion of tanker construction in Europe.

TABLE 1.—13,000-TON DEADWEIGHT TANKERS

Name	*R. P. Resor*	*Esso Bayonne*	*Louisiana*	*Connecticut*	*Wallace E. Pratt*	*F. S. Bryant*
Builder	Federal	Federal	Sun	Beth.—Sp. Pt.	Sun	Sun
Entered service	1936	1937	1937	1938	1937	1946
HULL CHARACTERISTICS						
Length, over-all	445'-0"	450'-0"	490'-6"	489'-10"	459'-6"	459'-7"
Length between perpendiculars	435'-0"	440'-0"	465'-0"	465'-0"	442'-0"	442'-0"
Breadth, molded	66'-6"	66'-6"	65'-0"	65'-0"	65'-0"	65'-0"
Depth, molded, at side amidships	34'-6"	34'-6"	34'-3"	34'-3"	35'-0"	35'-0"
Draft, molded, international summer freeboard	27'-11"	27'-10¼"	27'-9¾"	27'-9¾"	28'-5¼"	28'-9½"
Displacement, molded, bare hull, tons	16,779	16,886	17,956	17,930	17,211	17,415
Ratio: displacement ÷ (length/100)³	204	198	179	178	199	201
Block coefficient	0.725	0.721	0.747	0.747	0.736	0.736
Prismatic coefficient	0.780	0.776	0.756	0.755	0.751	0.751
Midship section coefficient	0.929	0.929	0.988	0.989	0.980	0.980
WEIGHTS						
Hull steel, tons	3,100	2,967	3,800	3,819	3,128	3,150
Outfit, tons	353	468	627	720	453	721
Cargo pumps, cargo piping and heating coils, tons	137	161	223	161	144	180
Machinery, tons	360	370	1,030	569	540	674
Total light ship weight, tons	3,950	3,966	5,680	5,269	4,265	4,725
Deadweight, tons	12,876	13,075	12,380	12,785	13,053	12,800
Displacement, tons	16,826	17,041	18,060	18,054	17,318	17,525
Ratio: Deadweight ÷ displacement	0.765	0.767	0.685	0.708	0.754	0.730
CAPACITIES						
Liquid cargo capacity, bbl (100%)	102,867	105,416	103,184	104,660	110,587	103,474
Ratio: Cargo capacity, bbl ÷ deadweight, tons	8.00	8.05	8.33	8.19	8.47	8.10
Dry cargo capacity, cu ft, bale	14,326	15,040	34,700	35,590	11,479	23,500
Bunker capacity, forward, bbl (100%)	....	....	3,147	3,490	4,600	4,748
Bunker capacity, aft, bbl (100%)	4,214	4,092	7,496	6,629	3,794	4,680
Bunker capacity, total, bbl (100%)	4,214	4,092	10,643	10,119	8,394	9,428
STRUCTURAL ARRANGEMENT						
Longitudinal bulkheads	2	2	2	2	2	2
Number of tanks	21	24	33	33	24	27
Length of single tank	37'-0"	34'-0"	28'-0"	29'-0"	34'-0"	34'-0"
Framing construction	Isherwood bracketless	Isherwood bracketed	Long'l center trans. wings	Long'l center trans. wings	Isherwood bracketless	Long'l
Bulkhead construction	Flat	Flat	Flat	Flat	Flat	Flat
Extent of welding	35%	55%	15%	15%	40%	95%
CARGO HANDLING						
Cargo pump rooms	1 Aft	1 Aft	2 Midship	2 Midship	1 Aft	1 Midship
Main pumps: Number	3	2	4 + 4	4 + 4	2	3 + 2 + 2
Main pumps: Type of drive	Electric	Electric	Turbine	Turbine	Electric	Recip.
Main pumps: Type of pump	Rotary	Rotary	Rotary	Rotary	Rotary	Recip.
Main pumps: Total capacity, bbl/hr	5,700	8,000	12,000	12,000	8,000	9,740
Main lines: Suction	2-12" & 2-8"	3-12"	4-12" & 16-8"	4-12" & 16-8"	3-12"	2-12" 2-8" 3-10" 4-6"
Main lines: Discharge	2-10" & 1-8"	2-10"	4-10" & 4-6"	4-10" & 4-6"	10"	3-10" 2-6" 2-8"
Stripping pumps: Number	...	1	2	2	1	.
Stripping pumps: Type of drive	...	Electric	Turbine	Turbine	Electric	
Stripping pumps: Type of pump	...	Rotary	Rotary	Rotary	Rotary	
Stripping pumps: Total capacity, bbl/hr	...	1,428	1,000	1,000	1,428	...
Stripping lines: Suction	1-6"	1-6"	...	...	6"	...
Stripping lines: Discharge	...	1-6"	...	...	6"	...
Ratio: Cargo capacity (bbl)	18.0	13.2	8.6	8.7	13.8	10.6

Name	*Esso Baton Rouge*	*L. P. St. Clair*	*Gulf-America*	*Gulflube*	*Ohio*	*Sinclair Opalin*	[illegible]
Builder	Beth—Sp Pt.	Beth.—Sp. Pt.	Beth—Sp. Pt.	Beth. Sp Pt.	Sun	Beth Quincy	[illegible]
Entered service	1938	1939	1942	1948	1940	1941	194[illegible]
HULL CHARACTERISTICS							
Length, over-all	463'-1"	463'-1"	463'-1"	471'-7"	513'-10"	471'-8"	474'-2[illegible]
Length between perpendiculars	442'-0"	442'-0"	442'-0"	450'-0"	485'-0"	450'-0"	450'-0"
Breadth, molded	64'-0"	64'-0"	64'-0"	64'-0"	68'-0"	63'-6"	65'-0"
Depth, molded, at side amidships	34'-10"	34'-10"	34'-10"	34'-10"	36'-0"	34'-6"	37'-0"
Draft, molded, international summer freeboard	28'-4"	28'-4"	28'-4"	28'-4"	28'-5"	27'-6¾"	28'-11[illegible]
Displacement, molded, bare hull, tons	16,855	16,855	16,855	16,941	19,209	16,089	17,705
Ratio: displacement ÷ (length/100)³	195	195	195	186	168	176	194
Block coefficient	0.736	0.736	0.736	0.727	0.717	0.715	0.732
Prismatic coefficient	0.759	0.759	0.759	0.749	0.729	0.750	0.748
Midship section coefficient	0.970	0.970	0.970	0.970	0.985	0.953	0.979
WEIGHTS							
Hull steel, tons	2,900	2,900	2,933	2,987	3,500	2,750	3,040
Outfit, tons	477	477	501	501	699	525	544
Cargo pumps, cargo piping and heating coils, tons	178	183	220	214	221	165	201
Machinery, tons	465	465	434	477	775	582	675
Total light ship weight, tons	4,020	4,025	4,088	4,179	5,195	4,022	4,460
Deadweight, tons	12,950	12,945	12,882	12,853	14,140	12,160	13,330
Displacement, tons	16,970	16,970	16,970	17,032	19,335	16,182	17,790
Ratio: Deadweight ÷ displacement	0.763	0.764	0.760	0.755	0.731	0.751	0.750
CAPACITIES							
Liquid cargo capacity, bbl (100%)	108,900	103,472	103,472	103,400	107,147	94,759	111,162
Ratio: Cargo capacity, bbl ÷ deadweight, tons	8.40	7.99	8.03	8.05	7.58	7.80	8.34
Dry cargo capacity, cu ft, bale	10,958	10,958	10,958	21,500	35,350	27,710	10,570
Bunker capacity, forward, bbl (100%)	3,960	3,935	2,200	2,231	4,436	2,096	2,500
Bunker capacity, aft, bbl (100%)	4,020	5,340	5,357	4,984	7,138	4,635	3,640
Bunker capacity, total, bbl (100%)	7,980	9,275	7,557	7,215	11,574	6,731	6,140
STRUCTURAL ARRANGEMENT							
Longitudinal bulkheads	2	2	2	2	2	2	2
Number of tanks	24	24	28	28	33	21	24
Length of single tank	34'-4"	34'-4"	34'-4"	34'-4"	28'-0"	36'-0"	34'-0"
Framing construction	Long'l	Long'l	Long'l	Long'l	Ish long'l center, trans. wings	Long'l	Long'l
Bulkhead construction	Frear flutes	Frear flutes	Frear flutes	Frear flutes	Flat	Frear flutes	Corrugated
Extent of welding	80%	80%	90%	90%	85%	80%	100%
CARGO HANDLING							
Cargo pump rooms	1 Aft	1 Midship	1 Midship	1 Midship	1 Midship	1 Fwd 1 Midship	1 Midship
Main pumps: Number	2	3	2 + 5 + 2	7 + 2	4 + 4	6	3
Main pumps: Type of drive	Electric	Turbine	Turbine	Turbine	Turbine	Recip.	Electric
Main pumps: Type of pump	Rotary	Rotary	Rotary	Rotary	Rotary	Recip.	Deepwell (centrifugal)
Main pumps: Total capacity, bbl/hr	8,000	9,000	9,000	10,000	12,000	6,000	12,900
Main lines: Suction	3-12"	3-12"	2-12", 5-10", 2-8"	2-12", 5-10" 2-8"	12"	10" tail pipe to each tank	12"
Main lines: Discharge	2-10"	4-10"	7-8" & 2-6"	7-8" & 2-6"	10"	6-8"	12"
Stripping pumps: Number	1	1	...	.	...	...	...
Stripping pumps: Type of drive	Electric	Turbine	...	.	...	...	...
Stripping pumps: Type of pump	Rotary	Rotary	.	...	...	...	...
Stripping pumps: Total capacity, bbl/hr	1,428	500	..	...	...	...	...
Stripping lines: Suction	1-6"	1-4"	..	...	6"	...	...
Stripping lines: Discharge	1-6"	2-4"	...	...	6"	...	...
Ratio: Cargo capacity (bbl)	13.6	11.5	11.5	10.3	8.9	15.8	[illegible]

TABLE 1.—13,000-TON DEADWEIGHT TANKERS—Continued

Name	*R. P. Resor*	*Esso Bayonne*	*Louisiana*	*Connecticut*	*Wallace E. Pratt*	*F. S. Bryant*	*Esso Baton Rouge*	*L. P. St Clair*	*Gulf-America*	*Gulflube*	*Ohio*	*Sinclair Opaline*	*Atlantic States*
MACHINERY PARTICULARS													
Shaft horsepower (maximum continuous)	3,300	3,300	4,850	5,000	3,950	5,500	4,000	4,000	3,960	6,050	10,000	4,400	6,030
Number of screws	1	1	1	1	1	1	1	1	1	1	1	1	1
RPM	93	93	91	95	89	93½	92	92	92	103½	93½	93	97
Propeller diameter	17'-3"	17'-3"	18'-0"	19'-0"	18'-0"	18'-3"	18'-6"	18'-6"	18'-6"	18'-9"	20'-6"	18'-0"	19'-0"
Speed on trial, knots	13.25	13.25	13.80	14.55	13.55	14.84	13.70	13.70	13.95	15.25	17.30	14.25	14.7
Nominal sea speed (trial speed at 80% shp)	12.45	12.45	13.01	13.65	12.70	14.26	12.95	12.95	13.25	14.75	16.55	13.15	13.9
Type of steam propulsion	Geared turbine	Geared-turbine	...	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared turbine	Geared turbine	Geared-turbine	Geared-turbine	Turbo-electric
Manufacturer	Allis-Chal	De Laval	.	Beth.	West	G. E.	Beth.	Beth	Beth	West	West	De Laval	G. E.
Number of bleeder points	3	3	...	2	2	3	2	2	2	1	1	3	3
Boilers: Number	2	2	2 / 1	2	2	2	2	2	2	2	2	2	2
Boilers: Manufacturer	F. W.	F. W.	Oil Fired F. W. / Waste Heat F. W.	F. W.	B & W	B & W	F. W.	F. W.	F. W.	F. W.	B & W	B & W.	B & W.
Boilers: Type	Bent tube	Bent tube	Bent tube / Straight tube	Bent tube	Straight tube	Straight tube	Bent tube	Bent tube	Bent tube	Straight tube	Bent tube	Straight tube	Straight tube
Boilers: Pressure, psi	400	400	225 / 125	400	425	450	400	400	400	465	450	450	700
Boilers: Temperature, deg F, Superheater outlet	750	750	397 / 353	650	725	730	750	750	750	750	750	725	910
Boilers: Type of air heater	Gas	None	None	None	Gas	Gas	None	None	None	None	None	Gas	Gas
Boilers: Economizer	Yes	Yes	None	Yes	None	None	Yes	Yes	Yes	Yes	Yes	None	None
Auxiliary electric generators: Number	2 / 1	2 / 1	2	2	2	2	2	2	2	2	2	2	2
Auxiliary electric generators: Type of drive	Geared-turbine / Attached	Geared-turbine / Attached	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine
Auxiliary electric generators: Current	d-c / d-c	d-c / d-c	d-c	d-c	d-c	d-c	d-c	d-c	d-c	d-c	d-c	d-c	a-c
Auxiliary electric generators: Capacity (each)	200 kw / 125 kw	300 kw / 125 kw	50 kw	150 kw	300 kw	200 kw	300 kw	150 kw	150 kw	300 kw	250 kw	200 kw	350 kw
Deck auxiliaries	Electric	Steam	Steam	Steam	Steam	Steam	Steam	Steam	Steam	Steam	Steam	Steam	Electric
Type of Diesel propulsion	...		Direct drive						...				...
Manufacturer	...		Sun-Oxford					...	...	...			
Number of engines	...		1						...			...	
Number of cylinders per engine			4			...	...	...	...	...			
2 or 4 cycle			2			...	...	...	...				

TABLE 2.—16,000-TON DEADWEIGHT TANKERS

Name	*Panamoco*	*Texas Sun*	*Mobilfuel*	*Corsicana*	*Esso Hartford*	*Mobilod*	*Stanvac Melbourne*	*Esso Albany*	*Ackey*	*Esso Gettysburg*	*Albert E. Watts*	*Flagship Sinco*
Builder	Sun	Sun	Beth. Sp Pt	Beth — Sp. Pt.	Beth — Sp. Pt.	Beth — Sp. Pt	Sun	Sun	Sun	Sun	Federal	Beth Quincy
Entered Service	1936	1937	1939	1941	1942	1943	1941	1941	1942	1942	1941	1942
HULL CHARACTERISTICS												
Length, over-all	501'-7½"	535'-5"	501'-7¾"	501'-4¾"	501'-7¾"	501'-7¾"	520'-0"	520'-0"	520'-0"	523'-6"	526'-10"	529'-0"
Length, between perpendiculars	485'-6"	511'-0"	487'-6"	488'-5"	487'-6"	487'-6"	500'-0"	500'-0"	500'-0"	503'-0"	505'-0"	505'-0"
Breadth, molded	68'-0"	65'-9"	68'-0"	68'-0"	68'-0"	68'-0"	68'-0"	68'-0"	68'-0"	68'-0"	72'-0"	72'-0"
Depth, molded, at side amidships	37'-0"	37'-0"	37'-0"	37'-0"	37'-0"	37'-0"	37'-0"	37'-0"	37'-0"	39'-3"	38'-0"	38'-0"
Draft, molded, international summer freeboard	29'-11¾"	29'-5½"	29'-10½"	30'-0"	29'-10½"	29'-10½"	29'-11⅝"	30'-0¼"	30'-0½"	30'-1⅛"	30'-6"	29'-10⅛"
Displacement, molded, bare hull, tons	21,306	21,902	21,365	20,913	21,365	21,365	21,688	21,713	21,728	21,780	22,086	22,224
Ratio: Displacement ÷ (length/100)³	186	165	184	179	184	184	174	174	174	171	172	173
Block coefficient	0.757	0.775	0.755	0.736	0.755	0.755	0.745	0.745	0.745	0.740	0.694	0.717
Prismatic coefficient	0.773	0.784	0.770	0.751	0.770	0.770	0.760	0.760	0.760	0.754	0.721	0.746
Midship section coefficient	0.978	0.988	0.980	0.980	0.980	0.980	0.981	0.981	0.981	0.981	0.963	0.961
WEIGHTS												
Hull steel	4,457	4,400	3,628	3,612	3,580	3,580	3,715	3,750	3,750	3,680	3,900	3,700
Outfit	631	610	584	614	584	584	570	557	710	597	664	540
Cargo pumps, cargo piping and heating coils	160	112	160	160	160	169	160	138	115	167	136	230
Machinery	687	1,130	581	781	621	597	630	740	825	665	650	655
Total light ship weight	5,935	6,252	4,953	5,167	4,945	4,930	5,075	5,185	5,400	5,109	5,350	5,125
Deadweight	15,515	15,800	16,550	15,910	16,585	16,600	16,725	16,640	16,440	16,771	16,928	17,229
Displacement	21,450	22,052	21,503	21,077	21,530	21,530	21,800	21,825	21,840	21,880	22,278	22,354
Ratio: Deadweight ÷ displacement	0.723	0.716	0.770	0.755	0.770	0.771	0.768	0.763	0.753	0.766	0.760	0.771

TABLE 2.—16,000-TON DEADWEIGHT TANKERS—*Continued*

Name	*Panamoco*	*Texas Sun*	*Mobilfuel*	*Corsicana*	*Esso Hartford*	*Mobiloil*	*Stanvac Melbourne*	*Esso Alsany*	*Aekay*	*Esso Gettysburg*	*Albert E Watts*	
CAPACITIES												
Liquid cargo capacity, bbl (100%)	131,191	134,313	133,884	132,670	133,812	133,989	138,523	138,523	138,523	141,158	132,000	[illegible]
Ratio: Cargo capacity ÷ deadweight, bbl/ton	8.45	8.49	8.09	8.33	8.07	8.10	8.28	8.33	8.42	8.41	7.80	[illegible]
Dry cargo capacity, cu ft, bale	13,190	14,169	26,520	18,413	24,722	24,722	10,178	21,483	21,483	15,203	40,027	[illegible]
Bunker capacity, forward, bbl (100%)	4,384	4,805	6,855	5,584	6,770	6,779	5,853	5,853	5,675	4,740	2,452	[illegible]
Bunker capacity, aft, bbl (100%)	4,358	5,282	4,805	4,809	4,810	4,808	4,634	4,634	4,634	4,995	5,873	[illegible]
Bunker capacity, total, bbl (100%)	8,742	10,087	11,660	10,393	11,580	11,587	10,487	10,487	10,309	9,735	8,325	[illegible]
STRUCTURAL ARRANGEMENTS												
Longitudinal bulkheads	2	2	2	2	2	2	2	2	2	2	2	2
Number of tanks	24	19	24	24	24	24	26	26	26	26	24	24
Length of single tank	36'-0"	35'-0"	36'-6"	36'-6"	36'-6"	36'-6"	36'-0"	36'-6"	36'-6"	36'-6"	35'-6"	36'-0"
Framing construction	Isherwood bracketless	Isherwood bracketless	Long'l	Long'l	Long'l	Long'l	Long'l	Long'l	Long'l	Long'l	Isherwood bracket-less	Long'l
Bulkhead construction	Flat	Flat	Frear flutes	Frear flutes	Frear flutes	Frear flutes	Corrugated	Flat	Flat	Corrugated	Flat	Frear flutes
Extent of welding	0	0	85%	90%	90%	90%	80%	80%	85%	100%	70%	80%
CARGO HANDLING												
Cargo pump rooms	Forward / Midship	Midship	1 Aft	1 Aft	1 Aft	1 Aft	1 Aft	1 Aft	1 Aft	1 Aft	1 Midship	1 Midship
Main pumps: Number	3 / 3	2	3	3	2	3	3	3	3	3	2	2
Main pumps: Type of drive	Turbine	Turbine	Electric	Electric	Electric	Electric	Electric	Electric	Electric	Electric	Turbine	Electric
Main pumps: Type of pump	Rotary	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Main pumps: Total capacity, bbl/hr	12,600	8,000	8,145	8,145	8,030	8,145	8,570	9,000	9,000	8,570	10,000	10,000
Main lines: Suction	2-12" & 2-10"	12"	3-12"	3-12"	3-12"	3-12"	12"	12"	12"	12"	14"	2-14"
Main lines: Discharge	3-12" & 3-10"	10"	3-12"	3-12"	2-10"	3-12"	12"	8"	8"	8"	14"	2-14"
Stripping pumps: Number	...	2	2 / 1	2 / 1	2	2 / 1	2 / 1	2 / 1	3	2 / 1	2	2
Stripping pumps: Type of drive	...	Turbine	Elect. / Turb.	Elect / Turb.	Recip.	Elect. / Turb.	Elect. / Recip.	Elect. / Recip.	Recip.	Elect / Recip.	Recip.	Recip.
Stripping pumps: Type of pump	...	Rotary	Rotary	Rotary	Recip.	Rotary	Rotary / Recip.	Rotary / Recip.	Recip.	Rotary / Recip.	Recip.	Recip.
Stripping pumps: Total capacity, bbl/hr	...	1,000	1,714	1,714	2,855	1,714	3,150	3,000	3,000	2,143	2,000	2,000
Stripping lines: Suction	3-4"	6"	...	....	1-6"	....	....	6"	6"	6"	8"	2-8"
Stripping lines: Discharge	2-4"	6"	3-3"	3-4"	1-6"	3-4"	4"	6"	6"	6"	6"	...
Ratio: Cargo capacity (bbl) ÷ main pumps, (bbl/hr	10.4	16.8	16.4	16.3	16.7	16.4	16.2	15.4	15.4	16.5	13.2	13.6
MACHINERY PARTICULARS												
Shaft horsepower (maximum continuous)	4,400	5,400	4,400	12,000	7,700	5,280	4,400	9,900	12,800	7,240	6,600	6,600
Number of screws	1	1	1	1	1	1	1	1	1	1	1	1
RPM	81	100	81	107	90	86	92	91½	103½	97	95	95
Propeller diameter	19'-8"	18'-6"	19'-8"	19'-8"	19'-8"	19'-8"	18'-6"	20'-3"	20'-3"	19'-6"	19'-0"	19'-3"
Speed on trial, knots	13.90	14.30	13.90	17.31	15.65	14.35	14.10	16.85	17.56	15.85	15.80	15.15
Nominal sea speed (trial speed at 80% shp)	13.10	13.40	13.05	16.72	15.00	13.50	13.28	16.15	16.90	15.00	14.70	14.35
Type of steam propulsion	Geared-turbine	...	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Turbo-electric	Geared-turbine	Geared-turbine
Manufacturer	De Laval	...	West.	West.	Beth.	West.	West.	G. E.	West.	G. E.	G. E.	De Laval
Number of bleeder points	1	...	2	2	3	2	2	3	3	3	3	3
Boilers: Number	2 Main / 1 Aux.	1 Oil Fired / 1 Waste Heat	2	2	2	2	2	2	2	2	2	2
Boilers: Manufacturer	F. W. / F. W.	F. W. / F. W.	F. W.	F. W.	F. W.	F. W.	B. & W.	B. & W.	B & W.	B. & W.	F. W.	B. & W.
Boilers: Type	Bent tube / Bent tube	Straight tube / Straight tube	Bent Tube	Bent tube	Bent tube	Bent tube	Straight tube	Bent tube	Straight tube	Straight tube	Bent tube	Straight tube
Boilers: Pressure, psi (Superheater Outlet)	375 / 400	200 / 100	400	420	450	425	435	450	450	450	465	450
Boilers: Temperature, deg F (Superheater Outlet)	700 / 448	487	725	725	730	750	735	764	742	730	750	740
Boilers: Type of air heater	None / None	None	None	None	None	None	Gas	None	Gas	Gas	Gas	Gas
Boilers: Economizer	Yes / None	None	Yes	Yes	Yes	Yes	None	Yes	None	None	Yes	None
Auxiliary electric generators: Number	2	3	2	2	2	2	2	2	2	2	2	2
Auxiliary electric generators: Type of drive	Geared-turbine	Diesel	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared turbine	Geared-turbine	Geared-turbine	Geared-turbine
Auxiliary electric generators: Current	d-c	d-c	d-c	d-c	d-c	d-c	d-c	d-c	a-c	a-c	d-c	d-c
Auxiliary electric generators: Capacity (each)	100 kw	100 kw	300 kw	300 kw	300 kw	300 kw	300 kw	400 kw	400 kw	525 kw	250 kw	250 kw
Deck auxiliaries	Steam	Steam	Steam	Steam	Steam	Steam	Steam	Steam	Steam	Steam	Steam	Steam
Type of Diesel propulsion	...	Direct drive	...	...	...	...	...	...	...	...	...	...
Manufacturer	...	Sun-Doxford	...	...	...	...	...	...	...	...	...	...
Number of engines	...	1	...	...	...	...	...	...	...	...	...	...
Number of cylinders per engine	...	6	.	...	...	...	...	...	...	...	...	...
2 or 4 cycle	...	2	...	...	...	...	...	...	...	...	...	...

FOOTNOTE. The *Esso Gettysburg* is a typical T2-SE-A1 of which 481 were built by Alabama, Kaiser, Marinship, and Sun. Forty-four T2-SE-A2 and A3 types having similar basic characteristics to T2-SE-A1, but with 10,000 shaft horsepower, were built by Marinship.

TABLE 5.—15,000-TON DEADWEIGHT TANKERS AND LARGER

Name	*J. W. Van Dyke*	*Pennsylvania Sun*	*Esso Augusta*	*Esso Richmond*	*Cimarron*	*Virginia*	18,000-ton "Beth" type	*Phoenix*	*Ulysses*	30,000-ton "Welding" type	28,000-ton "Beth." type	28,000-ton "Sun" type
Builder	Sun	Sun	Sun	Sun	Sun	Welding	Beth - Sp. Pt	Welding	Welding	Welding	Beth.—Sp. Pt.	Sun
Entered service	1938	1938	1940	1942	1939	1941	1949	1944	1947	1948	1949	1949
HULL CHARACTERISTICS												
Length, over-all	542'-5"	542'-11"	547'-2 3/4"	547'-2 3/4"	553'-0"	...		556'-0"	597'-6"	629'-8"	624'-7 1/2"	628'-0"
Length, between perpendiculars	521'-0"	521'-0"	521'-0"	521'-0"	525'-0"	500'-0"	524'-0"	541'-0"	582'-6"	615'-0"	595'-0"	600'-0"
Breadth, molded	70'-0"	70'-0"	70'-0"	70'-0"	75'-0"	70'-0"	68'-0"	80'-0"	80'-0"	84'-0"	84'-0"	82'-6"
Depth, molded, at side amidships	40'-0"	40'-0"	40'-0"	40'-0"	39'-0"	38'-6"	37'-0"	40'-0"	43'-9"	43'-9"	44'-0"	42'-6"
Draft, molded, international summer freeboard	30'-1 1/4"	30'-2 3/4"	30'-3 1/2"	30'-3 1/2"	31'-6 3/4"	30'-11 3/8"	29'-8 1/2"	31'-3 1/2"	33'-5 1/2"	33'-4"	33'-1 5/8"	31'-10"
Displacement, molded, bare hull, tons	24,238	24,110	23,976	23,976	24,594		23,256	29,175	34,550	37,636	36,240	34,480
Ratio: displacement ÷ (length/100)³	172	171	170	170	170		162	184	175	162	172	160
Block coefficient	0.776	0.765	0.759	0.759	0.693	0.753	0.770	0.751	0.775	0.765	0.766	0.766
Prismatic coefficient	0.791	0.779	0.774	0.774	0.702	0.778	0.786	0.768	0.792	0.778	0.770	0.771
Midship section coefficient	0.981	0.981	0.981	0.981	0.986	0.970	0.980	0.982	0.982	0.984	0.994	0.994
WEIGHTS												
Hull steel	4,371	4,330	4,100	4,000	4,530	3,430	4,040	4,630	5,700	6,476	6,030	6,005
Outfit	629	658	612	696	768	354	609	352	382	450	825	943
Cargo pumps, cargo piping and heating coils	188	112	168	171	162	650	213	690	700	830	390	279
Machinery	677	1,270	1,280	793	1,140		521				855	873
Total light ship weight	5,865	6,370	6,160	5,660	6,600	4,434	5,383	5,672	6,782	7,756	8,100	8,100
Deadweight	18,500	17,870	17,950	18,450	18,230	18,900	18,052	23,598	27,928	30,000	28,360	26,545
Displacement	24,365	24,240	24,110	24,110	24,830	23,330	23,435	29,270	34,710	37,756	36,460	34,645
Ratio: deadweight ÷ displacement	0.760	0.737	0.744	0.765	0.734	0.810	0.770	0.805	0.804	0.795	0.778	0.766
CAPACITIES												
Liquid cargo capacity, bbl (100%)	154,760	157,370	156,840	156,840	149,005	157,985	151,500	217,795	251,364	255,050	240,000	230,220
Ratio: Cargo capacity, bbl ÷ deadweight, tons	8.34	8.80	8.72	8.49	8.16	8.36	8.39	9.23	9.00	8.50	8.47	8.67
Dry cargo capacity, cu ft, bale	39,685	15,538	15,930	15,930	15,576	0	24,722	0	0	[illegible]	25,000	53,154
Bunker capacity, forward, bbl (100%)	4,750	2,710	2,624	2,624	8,156	4,415	6,770	5,240	9,659	11,420	7,586	8,130
Bunker capacity, aft, bbl (100%)	4,520	4,525	5,520	6,442	8,052	5,936	4,810	6,791	6,794	16,400	6,760	9,750
Bunker capacity, total, bbl (100%)	9,270	7,235	8,144	9,066	16,208	10,351	11,580	12,031	16,453	27,820	14,346	17,880
STRUCTURAL ARRANGEMENT												
Longitudinal bulkheads	2	2	2	2	2	2	2	2	2	2	2	2
Number of tanks	27	28	28	28	26	26	27	26	26	26	30	30
Length of single tank	35'-0"	35'-0"	35'-0"	35'-0"	35'-0"	40'-10"	36'-6"	41'-6"	41'-6"	42'-0"	[illegible]	39'-4"
Framing construction	Isherwood bracketless	Isherwood bracketless	Long'l	Long'l	Long'l	Long'l	Long'l	Long'l	Long'l	Long'l	Long'l	Long'l
Bulkhead construction	Flat	Flat	Flat	Flat	Flat	Corrugated	Frear flutes	Corrugated	Corrugated	Corrugated	Frear flutes	Flat
Extent of welding	70%	70%	100%	100%	80%	100%	90%	100%	100%	100%	95%	95%
CARGO HANDLING												
Cargo pump rooms	1 Midship	1 Midship	1 Midship	1 Midship	Midship Aft	1 Aft	1 Aft	1 Aft	1 Aft	1 Aft	1 Aft	1 Aft
Main pumps: Number	3	2	3	3	2 3	.	2	3	3	3	4	4
Main pumps: Type of drive	Electric	Electric	Turbine	Turbine	Recip. Turb.	..	Electric	Turbine	Turbine	Turbine	Turbine	Turbine
Main pumps: Type of pump	Deep well (centrifugal)	Centrifugal	Centrifugal	Centrifugal	Recip. Centrif.	...	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Main pumps: Total capacity, bbl/hr	15,000	8,000	12,000	12,000	12,570	...	8,030	13,720	13,720	13,720	23,425	23,400
Main lines: Suction	12"	12"	12"	12"	12"	...	3-12"	12"	12"	3-12"	4-14"	4-14"
Main lines: Discharge	12"	10"	12"	12"	10"	...	2-10"	10"	10"	3-10"	4-14"	4-14"
Stripping pumps: Number	..	2	1	2	1 Aft	...	2	3	3	3	4	1 2
Stripping pumps: Type of drive	.	Electric	Recip.	Recip.	Recip.	...	Recip.	Recip.	Recip.	Recip.	Recip.	Electric Recip.
Stripping pumps: Type of pump		Recip.	Recip.	Recip.	Recip.	...	Recip.	Recip.	Recip.	Recip.	Recip	Rotary Recip
Stripping pumps: Total capacity, bbl/hr	..	1,140	1,000	2,000	2,000	...	2,855	2,622	2,622	2,622	2,856	3,000
Stripping lines: Suction	..	6"	6"	6"	10"	..	1-6"	8"	8"	8"	1-6"	1-6"
Stripping lines: Discharge	..	6"	6"	6"	6"	.	1-6"	6"	6"	6"	1-6"	1-6"
Ratio: Cargo capacity (bbl) ÷ main pumps (bbl/hr)	10.3	19.7	13.1	13.1	11.9	.	18.9	15.9	18.3	18.6	10.2	9.8
MACHINERY PARTICULARS												
Shaft horsepower (maximum continuous)	6,040	7,200	8,250	9,020	15,200	9,430	6,050	13,400	13,400	17,600	13,750	13,750
Number of screws	1	1	1	1	2	1	1	1	1	1	1	1
Rpm	97	96	95	97 1/2	100	...	103	105	109 1/4	120	103	117
Propeller diameter	19'-6"	19'-6"	20'-0"	20'-0"	17'-6"	...	19'-3"	21'-0"	21'-6"	20'-0"	22'-0"	20'-0"
Speed on trial, knots	13.80	15.30	15.40	15.75	19.25	...	14.63	17	16 1/2	17	17.25	17.05
Nominal sea speed (trial speed at 80% shp)	12.90	14.55	14.45	14.80	18.45	...	13.67	16 1/2	16	16 1/2	16.43	16.30
Type of steam propulsion	Turbo electric	...	..	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared turbine
Manufacturer	G. E.	..	...	West.	West.	Allis Chal.	West.	West	West	G. E.	Beth	G. E.

TABLE 3. 18,000-TON DEADWEIGHT TANKERS AND LARGER—*Continued*

Name	*J. W. Van Dyke*	*Pennsylvania Sun*		*Esso Augusta*			*Esso Richmond*	*Cimarron*	*Virginia*	18,000-ton "Beth" type	*Phoenix*	*Ulysses*	30,000-ton "Welding" type	28,000-ton "Beth." type	[illegible]
Number of bleeder points	3	.		. . .			4	3	. . .	1	1	1	1	.	[illegible]
Boilers: Number	2	1 Oil fired	1 Waste heat	1 Oil fired	1 Oil fired	1 Waste heat	2	4	. . .	2	2	2	2	2	[illegible]
Boilers: Manufacturer	B & W	F. W.	F. W	F. W	F. W.	F. W	B & W.	B & W.	F. W.	F. W.	F. W.	F. W.	F. W.	F. W	B. & W
Boilers: Type	Straight tube	Straight tube	Straight tube	Straight tube	Straight tube	Straight tube	Straight tube	Straight tube	Straight tube	Straight tube	Bent tube	Bent tube	Bent tube	Bent tube	Straight tube
Boilers: Pressure, psi	625	200	125	200	200	200	450	450	. . .	465	525	525	600	600	850
Boilers: Temperature, deg F. Superheater outlet	835	387	353	540	387	387	746	750	. . .	750	750	750	850	850	850
Boilers: Type of air heater	Gas	None		None			Gas	Gas	. . .	None	None	None	None	Steam	Gas
Boilers: Economizer	None	None		None			None	None	. .	Yes	Yes	Yes	Yes	Yes	Yes
Auxiliary electric generators: Number	2	3		2			2	2	. .	2	2	2	2	2	2
Auxiliary electric generators: Type of drive	Geared-turbine	Diesel		Geared-turbine			Geared-turbine	Geared-turbine		Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared-turbine	Geared turbine
Auxiliary electric generators: Current	a-c	a-c		d-c			d-c	a-c	. . .	d-c	a-c	a-c	a-c	a-c	a-c
Auxiliary electric generators: Capacity (each)	350 kw	400 kw		300 kw			300 kw	400 kw	.	300 kw	400 kw	400 kw	400 kw	400 kw	400 kw
Deck auxiliaries	Electric	Steam		Steam			Steam	Steam	. .	Steam	. . .	. . .	. . .	Steam	Steam
Type of Diesel propulsion	.	Direct drive		Direct drive			.	. . .	. . .	. . .	. . .	. . .	.	. .	
Manufacturer	. . .	Sun-Doxford		Sun-Doxford			. .	. .	. .	. . .	. . .	. .	.		
Number of engines	.	1		1			.	.	. .	. . .	. . .	. . .	.	.	
Number of cylinders per engine	.	5		5			. .	.	.		. . .	. . .			
2 or 4 cycle	.	2		2						.	. . .	. . .			

The tables above, beginning on page 38, are from the paper "Modern Tankers," read at the annual meeting of the Society of Naval Architects and Marine Engineers last month.

Tankers

(Continued from page 37)

capacity with speed and deadweight based on runs of 2,000 and 6,000 miles between ports.

Equipment

All of these new ships will have geared turbine single screw drive, with the Bethlehem-built ships using Bethlehem turbines from the Fairfield plant. It is of interest that the turbines for *all* of the 26,000 ton ships are of the same shaft horsepower—12,500 normal and 13,750 maximum overload. Sun is building two ships with Westinghouse turbines, four with General Electric, and seven with DeLaval. Newport News is building five with General Electric and six with their own. The 30,000 ton ships at Welding Shipyards will have General Electric turbines, while for the 32,000 tonners at New York Ship, the propulsion equipment has not been announced.

The boilers in most of the 28,000 ton "Bethlehem type" and 30,000 ton "Welding type" are Foster Wheeler bent tube, 600 psi pressure, with 850° F. temperature, while on most of the 26,000 ton "Sun" type, they are Babcock & Wilcox straight tube 850 psi, 850° F. Here again, however, the specifications vary from company to company, for B & W have equipment on a number of 28,000 ton vessels including those for Standard of California. The detail of B & W specifications shows the following:

Two 28,000 Ton Dd. Wt. Tankers—Bethlehem Steel Co., Quincy Plant.

Four 26-000 Ton for Standard Oil of California—Sun Shipbuilding & Drydock Co.

Two for Gulf Oil Company 26,000 tons.

Ten 26,000 Ton for Standard Oil of New Jersey—Newport News Shipbuilding & DD Co.

One for Atlantic Marine Co., 26,000 tons.

For the above seventeen tankers the following description and engineering data is applicable.

Each tanker is equipped with two two-drum D type boilers each having a 48" normal diameter steam drum and a 30" water drum complete with superheaters, economizers, and air heaters. Each boiler is fired by four B&W Iowa type burners. Each boiler is designed to generate 50,000 pounds of steam per hour at the normal load and 67,500 pounds at the overload at a working pressure of 850 psig. and a total steam temperature of 850° F. from feedwater at a temperature of 400° F.

For the seven 26,000 deadweight ton tankers being built by Sun Shipbuilding for Tankers Navigation Company, Inc., the following description applies:

Each tanker has two two-drum D type boilers complete with superheater and economizer. Each boiler is fired by four B&W Iowa type burners. Each boiler is designed to generate steam at 52,500 pounds per hour at a normal rate and 78,750 at the overload rate, at a working pressure of 600 psig. Steam is delivered at 800° F. at the superheater outlet from feedwater at a temperature of 240° F.

For the five 28,000 ton tankers being built by Bethle-

hem Steel Company at Sparrows Point for the Foreign Tankship Corporation, which is an interest of Standard Oil of California, the following description applies.

Each tanker is equipped with two D type boilers equipped with superheaters and air heaters. At the normal rating each boiler is designed to generate 57,755 pounds of steam per hour and at the overload 63,830 pounds per hour at a working pressure of 600 psig and a feedwater temperature of 830°F and a steam temperature of 830°F.

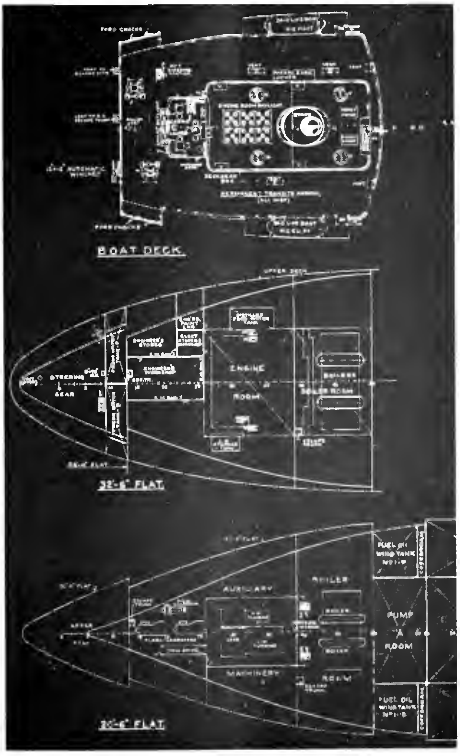
On seven vessels for Socony-Vacuum (26,000 tons), Sun will install Foster-Wheeler boilers 600 pound, 800 as against the 850 850 originally planned. Foster-Wheeler automatic evaporators on these ships will have a capacity of 20 tons per day and can be operated as single or double effect units. As a result of using these evaporators, the water storage space aboard the vessel has been materially reduced, thus permitting an increase in cargo deadweight carried. On these ships also, access to the shaft alley is provided from the boiler room.

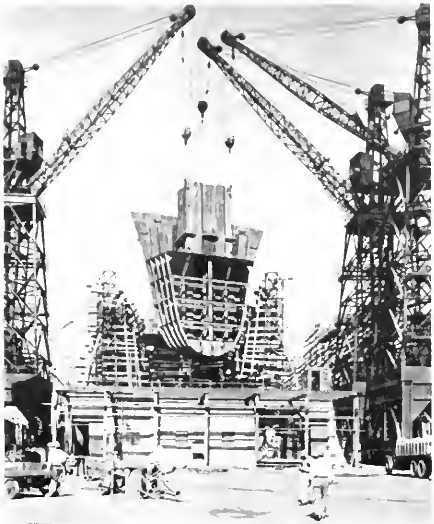
In addition to the Socony-Vacuum ships, Foster-Wheeler is furnishing boilers and economizers for the following hulls, all of which are of the super types: hulls 4467, 4468, 4469, 4470, 4471, 4472, 4473, 4474, 4475, 1607, 1608 and 1611. The last three are at Bethlehem-Quincy while all the rest are at Bethlehem-Sparrows Point.

It is not announced as yet but it is understood that certain of the largest types of vessels will have Combustion Engineering's sectional header boilers of 650 psi and 1000° temperature. More of this in subsequent stories.

The auxiliary electric generators (2 each), geared turbine, are 400 KW A-C for all types, and are about evenly balanced between Westinghouse and General Electric. Main switchboards are mostly Westinghouse, although eleven Sun jobs are General Electric. As far as we are advised, all ships are to have Westinghouse Micarta bearings, bracket fans and searchlights, while other major equipment is widely distributed as to manufacture.

Machinery arrangement plans for vessels diagrammed on page 44.

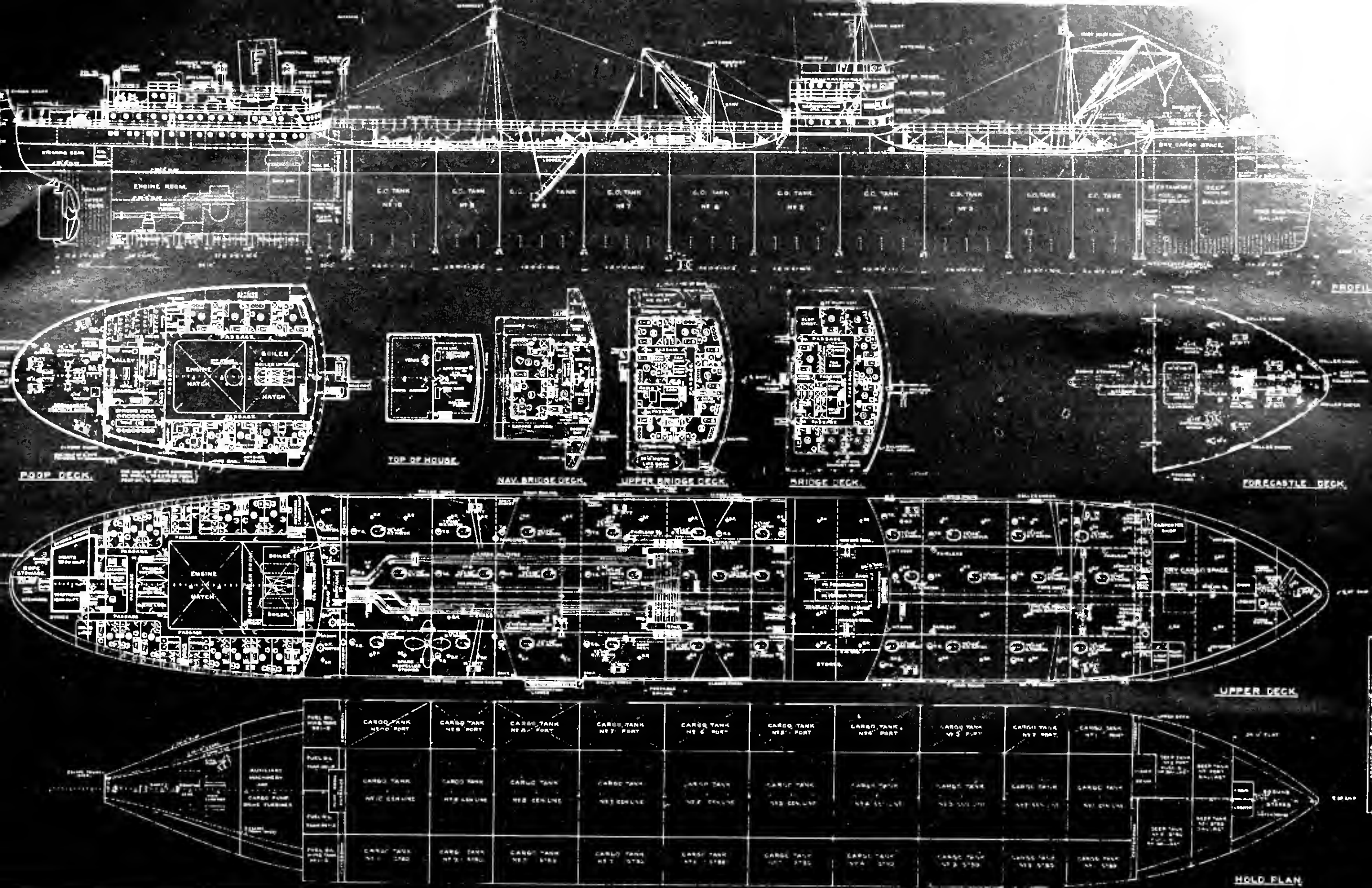




A 48½ ton prefabricated section of a large tanker being set in place at the Bethlehem Sparrows Point Yard. This picture adorns the cover page of Bethlehem's Shipbuilding Division's 1949 calendar.

General Arrangement

Most of these vessels follow a fairly uniform profile plan. They are three-island single screw, geared turbine driven, with a curved raked stem and cruiser stern, with one complete deck, and propulsion machinery aft. The deck, profile and arrangement plans on pages 43 and 44 are of the 28,000 ton type for the Foreign Tankship Corp., subsidiary of Standard Oil of California. Bethle-



Inboard profile and principal deck plans and cargo hold plans of five 28,000-ton tankers for Foreign Tankship Corp., a subsidiary of Standard Oil of California. Bethlehem-Sparrows Point has the contract.

hem, Sparrows Point, has the contract.

PARTICULARS

Length overall	[illegible]
Length between perpendiculars	[illegible]
Breadth molded	[illegible]
Depth, moulded to upper deck at side, amidships	[illegible]
Draft, moulded to designed waterline	[illegible]
Displacement, total, at designed waterline	[illegible],000 tons
Deadweight to designed waterline	[illegible],000 [illegible]
Designed sea speed at designed waterline	1[illegible] knots

At the maximum SHP, the trial speed would be about 16¾ knots.

ESTIMATED CAPACITIES

Liquid cargo capacity, 100% full	[illegible]0,400 barrels
Dry cargo capacity, bale	65,[illegible] cu. ft.
Fuel oil, 100% full	
Forward deep tanks	[illegible] barrels
After deep tanks	6,800 barrels
Fresh water	15[illegible] tons

The hull will be divided by watertight and oiltight transverse bulkheads into compartments as follows:

- Fore peak, chain locker, Boatswain's stores.
- Dry cargo spaces, deep tank for fuel oil or ballast, ballast, and transfer pump room.
- Fore cofferdam.
- Nos. 1 to 10 cargo oil tanks.
- After cofferdam, Pump room.
- Fuel oil bunker tanks.
- Boiler room.
- Engine room.
- After peak, steering gear room.

Two continuous oiltight longitudinal bulkheads together with nine transverse bulkheads will divide the cargo oil space into thirty tanks.

The forepeak will be used for ballast only. The deep tank forward will be fitted for fuel oil or ballast and the spaces over, on the Lower and Upper decks, will be fitted for dry cargo.

There will be an oiltight enclosure in the deep tank forward for the ballast and fuel oil transfer pumps. Access will be provided by means of a steel trunk and ladder from a companionway on the Upper deck. Access to the lower dry cargo space will be by an inclined ladder from the Upper deck and by cargo hatches fitted into the Forecastle and Upper decks.

A carpenter shop, lamp room and paint room will be fitted in the forecastle, each having access directly to the open deck. A tonnage opening is to be provided in the after bulkhead of the upper deck forecastle space.

On the upper deck under the bridge houses amidships there will be a fresh water tank, stowage spaces for stewards and mates stores and cargo oil hose and miscellaneous stowage. A tonnage opening will be provided in the after bulkhead of this space.

The bridge houses will be fitted for accommodations for the captain, deck officers, and radio operation in addition to the wheelhouse, chart room, gyro room, ship's office and ventilation fan room.

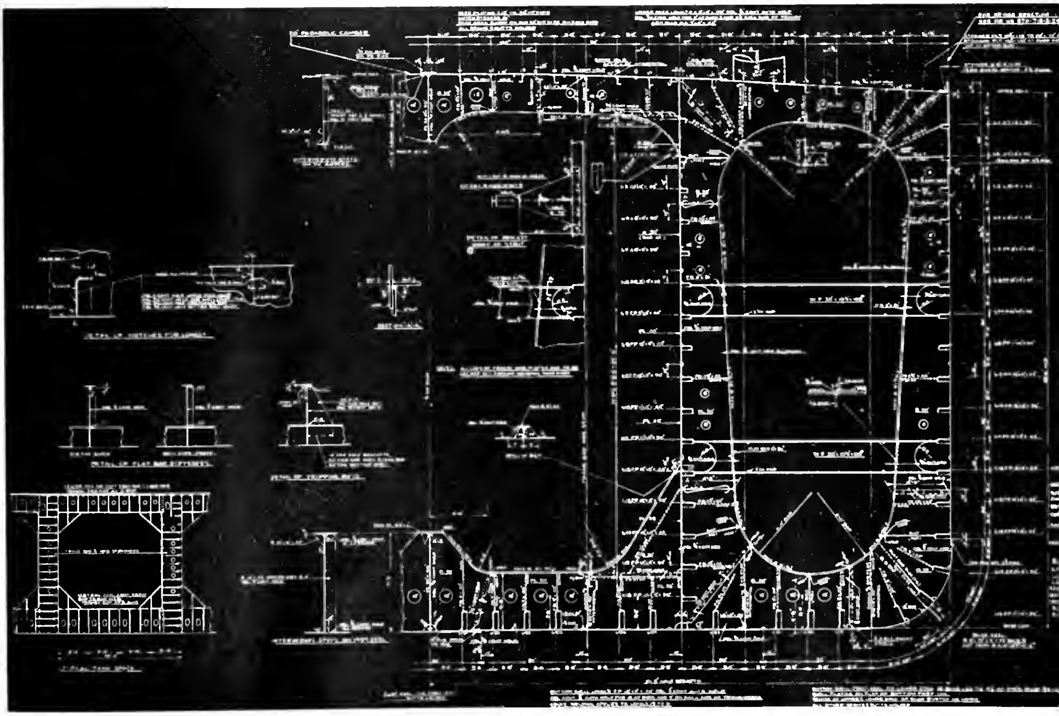
In the poop enclosure and the poop house, accommodations shall be provided for the engineering officers, the steward and the crew. Additional spaces will be fitted for the galley, mess rooms, recreation rooms, stores spaces, laundry, emergency generator room and fan room.

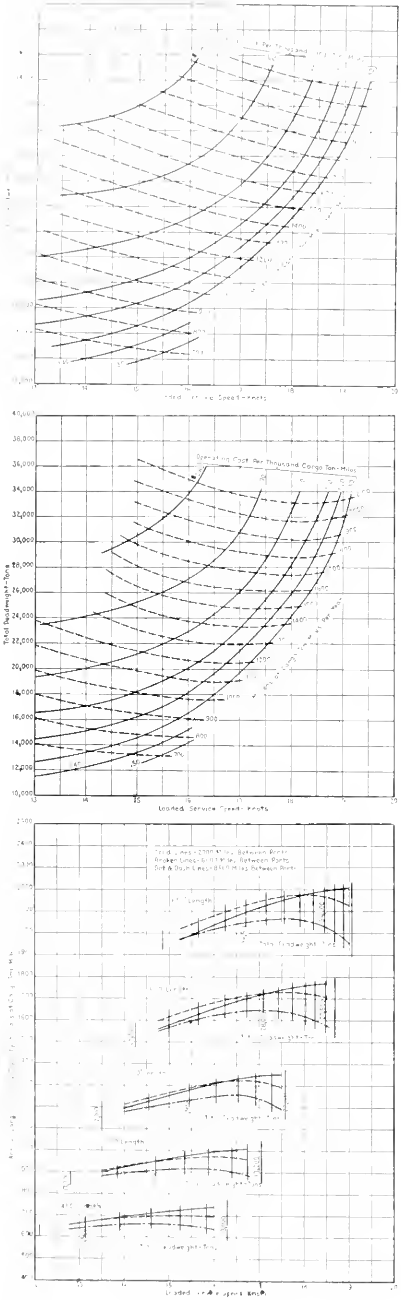
A separate house on the poop deck house top will be fitted for a hospital.

Machinery Description

The vessel will be arranged for single screw propulsion with geared turbine propelling machinery located in a machinery space aft. The principal characteristics of the

Midship section of 26,000-to tanker for Socony Vacuum.





Cost of Operations graphs from the paper "Modern Tankers," referred to on page 37.

Top to bottom:

Variation of operating cost and cargo-carrying capacity with speed and deadweight (2,000 miles between ports).

Variation of operating cost and cargo-carrying capacity with speed and deadweight (6,000 miles between ports).

Annual cargo-carrying capacity for varying deadweights and speeds.

machinery installations will be as follows.

Shaft horsepower
- Normal ahead ..12,500 SHP at 100 RPM
- Maximum ahead . 13,750 SHP at 103 RPM

Steam Conditions
- At boiler superheater outlet ...600#G-850°F
- At turbine throttle ...585#G-840°F

Main Condenser Vacuum (12,500 SHP—75°F sea water) ...28½" hg.

Designed fuel rate (all purposes at 12,500 SHP 18,500 BTP/lb. oil) . 0.54 lbs/SHP-hr.

The propulsion unit will consist of a series flow high pressure and low pressure turbine arranged to drive a propeller through double reduction gears and a line of shafting. An astern element is to be incorporated in the low pressure turbine designed to develop 80 per cent of the normal ahead torque at 50 per cent of normal ahead RPM with a steam flow not greater than that which is available when burning oil at the rate required for maximum power ahead. They will also be capable of operating at 70 per cent of normal ahead RPM for one-half hour. The low pressure turbine and astern elements will exhaust into a surface type condenser located beneath the turbines.

The two boilers will be fitted with superheaters, desuperheaters, waterwalls, economizer, steam type air heaters and automatic combustion controls. The boiler feed system will be of the deaerating type with two stages of feed heating.

The electric plant will consist of two 400 KW-450 volt, alternating current, geared turbo-generator sets complete with necessary auxiliaries and switchboards. A 75 KW-450 volt Diesel engine driven generator and switchboard shall be provided for emergency lighting and for dead ship starting.

The cargo oil system is to be arranged so that up to four different petroleum products may be handled simultaneously. Four turbine driven centrifugal pumps will do the cargo pumping. In addition four steam driven reciprocating pumps will be installed for tank stripping purposes.

Crew accommodations will be provided for a total complement of 47 persons, consisting of 16 deck department, 17 engine department, and 9 steward department personnel, and 5 spares.

To be continued—

Details on various phases of the construction of this and other tanker projects will appear in subsequent issues of *Pacific Marine Review*. There is special interest in the amount of welding as compared with riveting, the machinery arrangement, electronic equipment, and many other subjects.

Tanker Transportation

By M. G. GAMBLE
General Manager of Marine Operations
Standard Oil Company (New Jersey)

FOLLOWING the discovery of oil in Pennsylvania in 1859 the problem of petroleum transportation by water first presented itself. An economical means of transporting the oil from the upper reaches of the Allegheny River to the Pittsburgh area was initially found through the use of rafts steered by poles and floated down the river with the current. This means of transport was followed by improvement in barge design and by ocean shipments by means of cases and barrels loaded in dry cargo sailing vessels. Later, an early type of tanker was developed. It contained separate steel tanks with air spaces under and around them. The chief objection to this latter type of carrier was a tendency toward excessive gas collecting in the space around the tanks with consequent danger to personnel and equipment.

However, in 1886 the transportation of oil by tanker in much the same manner as we know it today began with the construction in a British shipyard of the S. S. *Gluckauf*. Since that time considerable progress has been made in hull and machinery design and much more is in prospect; but the principle of carrying oil in tanks extending to the skin of the ship in a large seagoing vessel has remained the same over these 62 years, and there is little likelihood of this form of transportation meeting any serious competition in the future.

The trend of tanker design has always been toward larger and faster ships, but the greatest progress in this direction has been within the last ten years. In 1938 in order to facilitate the construction of tankers satisfactory to the Navy Department for use as Navy oilers, and at the same time serviceable in commercial trades, Standard Oil Co. (N. J.) entered into a contract with the U. S. Maritime Commission which resulted in our company placing contracts with four shipyards for the construction of a total of twelve such tankers. These vessels had a deadweight of about 18,300 tons, a contract speed of 18 knots and an approximate capacity of 146,000 barrels.

Under the terms of this agreement and in collaboration with the Navy and the Maritime Commission, the Standard Oil Co. (N. J.) designed and built these special tankers and the Government paid the cost of the National Defense features. At that time these ships were among the largest and were the fastest tankers ever built in American shipyards. The National Defense features incorporated in them enhanced their value for speedy and economical conversion into Naval auxiliaries—and four of them were even converted into baby flat tops. These vessels also paved the way for the Government's extensive war-time tanker construction program and for the larger tankers being built by private industry today.


M. G. Gamble

In a general discussion of tankers it is interesting to review and compare the tanker tonnage situation during and after the two world wars. In 1914 the total world tanker fleet consisted of little more than 2,000,000 deadweight tons; about 87% of which was under foreign flags. However, due largely to construction in U. S. shipyards the world tonnage by the end of 1921 had increased to about 7,000,000 tons, more than half of which was under the U. S. flag. But unlike the situation at the close of the recent war, U. S. Government owned tankers accounted for only about one-fourth of the U. S. flag tonnage. A business depression then set in which, coupled with low cost construction in European yards, brought building in U. S. yards to a standstill. In the period from 1921 to 1929 foreign flag tonnage increased about 150% due to construction in Europe, while in the United States we were struggling to absorb the American flag surplus.

In 1929-1930 it began for a time to look as though U. S. tanker construction would again come into its own, but once again a serious business depression called a halt. By 1935 the U. S. flag tanker fleet had dropped to about 30% of the world tonnage and consisted mainly of vessels approaching obsolescence. Although there was

* Paper presented at the Panel on Merchant Marine and National Defense, October 13, 1948.

rise in the construction of tankers from that the pace of building in U. S. yards did not approach that in foreign yards until 1941. In 1942 submarine warfare reached its peak; U. S. ship construction was speeded up rapidly, and for the first time since World War I tanker construction in this country exceeded that in foreign yards. The bulk of our war-built commercial fleet, which consisted of about 9,000,000 tons of T-2 type tankers having a deadweight of about 16,600 tons and a speed of 15 knots, was constructed during the next three years. Today, about 43% of the world's tanker tonnage is under the U. S. flag, and while the volume of tonnage under construction here does not equal that being built in Europe, orders recently placed here call for a substantial number of tankers having a deadweight of 26,000 or more tons and a speed of about 16 knots.

While the war resulted in the loss of about 40% of the prewar world-wide tanker fleet, this was more than replaced by new construction, and the overall effect has been to hasten the general utilization of larger and faster ships. One might say that size and speed more than any other factor, are means of combating today's high transportation costs which have more than doubled since 1939.

On the other hand, it should be remembered that the larger and faster the vessel the more valuable her time and the greater the possible savings from improved turnaround. In fact, we might go so far as to say that from the standpoint of economy, quick turnaround is second only in importance to the utilization of large fast ships. Even a T-2 has an average cost at the dock of about $2,000 per day, and the corresponding cost of a modern 26,000 ton vessel would be about 30% more. This gives some idea of the importance of keeping port time to a minimum.

The industry's tanker tonnage position today is very different from what it was a year ago. At that time we were in the throes of transition of the war-built fleet from Government to private ownership and many tankers were immobilized until the completion of this transition several months ago. In other words, from the Fall of 1947 and extending through the Spring of 1948 we were all feeling the effects of an apparent serious worldwide shortage of tankers, while the fact was that the tankers afloat during that period would have been ample had they all been in operation. During recent months, our problem has been to find use for the surplus tanker tonnage, as private companies have been forced, because of the lack of business, to tie up from 60 to 70 tankers. Under these conditions it is unlikely that a serious shortage of tanker transportation will develop during the coming winter period.

Here, it might be interesting to summarize the tanker tonnage in the world today and express it in terms of the T-2 type, which we might call the representative war-built tanker.

A survey made last April of tankers of 2,000 gross tons and over showed that including all types there were the equivalent of 1264 T-2s in the world with an aggregate deadweight of about 21 million tons. Of these, 542 vessels or 9,000,000 tons were under the American flag. Other Western Hemisphere tonnage totaled 149 ships of this type, having a deadweight of 2½ million tons, and Eastern Hemisphere tonnage accounted for the remainder of 573 vessels or 9½ million tons.

Summarizing the world's tanker fleet from another point of view, it is interesting to note that tonnage under the U. S., Panamanian and Canadian flags represents about 53% of the total, and if we add the tonnage owned by ECA countries we find that 95% of all the tanker tonnage in the world is thus accounted for.

It is difficult to forecast the adequacy of the world's tanker fleet to take care of future petroleum transportation needs. This is particularly true today when there are substantial movements from the Persian Gulf to this hemisphere, which involve four times the tanker tonnage required for a movement of the same volume from the U. S. Gulf to New York. However, it is my feeling that under peacetime conditions the tankers now available, augmented by new deliveries which might reasonably be expected, will be very closely in balance with expected transportation needs for the next few years. Much, of course, will depend on the extent to which obsolete vessels are retired from service, which in turn is largely influenced by the tanker market and resultant freight rates.

If we assume that over a long-range period of say 20 years the average life of a tanker is twenty years, additional new tonnage to the extent of 5% of the existing fleet would be required annually, without any regard for increased oil requirements or any effect from possible longer hauls. If, in addition, we assume a long-term factor of say 3% annually, representing overall increased petroleum transportation requirements, 8% of the total tonnage or about 100 equivalent T-2s in the form of new construction would be required each year. At this point the question might well be raised as to how well the tanker construction program now under way would meet such a requirement over the next few years.

In 1947, 31 ocean tankers were constructed throughout the world, all but one of which were delivered from foreign yards. So far this year, only 21 tankers have been delivered, but 28 others reported launched in European yards will undoubtedly be delivered before the year ends. Adding probable completions in this country of 4 or 5 more we get a total of more than 50 new tankers for addition to the world fleet in the current year. According to the best available information there are the equivalent of 115 T-2s under construction or on order in the United States today, and 286 of the same type building or on order in Europe—thus making a total of more than 400 equivalent T-2s scheduled for delivery over the next four years. This represents an average of 100 per year, which strangely enough coincides with the long-range requirement of about 100 per year previously mentioned. On the other hand, if, as appears likely, the average long-term rate of growth in requirements will be exceeded over the near term, a balance might well be arrived at by further postponement of retirements from obsolescence.

In viewing the world-wide tanker situation, I cannot help but feel that the most difficult period of postwar readjustment is behind us, and that the industry can be depended upon to meet all anticipated commercial requirements under peacetime conditions.

Supertanker

THE *Esso Zurich*, at present Hull 566 of the Sun Shipbuilding & Dry Dock Company at Chester Pennsylvania, is the first of fourteen sisters which will be built for the Esso fleet by the summer of 1950. Into their design and construction are being poured all the knowledge and skill accumulated in the sixty-two-year history of the specialized vessels called tankships.

The Jersey Standard tanker fleet of 131 oceangoing ships, plus 84 special types such as lake tankers, is already larger than before the war, despite a wartime loss of 84 vessels. The fourteen new ships, costing more than $75 million, will add to the fleet 3,192,000 barrels of cargo capacity—the equivalent of a train of standard tank cars just over 100 miles long. This formidable investment in the future of the oil business is a measure of the world's insatiable, and still growing, demand for petroleum. It is also an indication of the increasingly critical role of transportation in meeting that demand, as an ever larger proportion of the world's oil is supplied from areas remote from the great oil-consuming population centers.

One of these remote areas is the Middle East, whose enormous petroleum reserves are counted on to supply an increasing share of the oil needs of western Europe. At present, tankers are moving some 925,000 barrels of crude oil daily from Persian Gulf ports. The approximate equivalent of 350 tankers, each of about 138,000 barrels capacity, is engaged in this trade, and two-thirds of the ships are making the long, uneconomic haul around the Arabian peninsula, through the Suez Canal and the Mediterranean to western European countries.

Although this movement of oil is greater than ever before, there are enough tankers to meet today's needs. However, the expected expansion in Middle East crude oil production and in Eastern Hemisphere refining capacities will impose an increasing load on oil transport facilities in that part of the world.

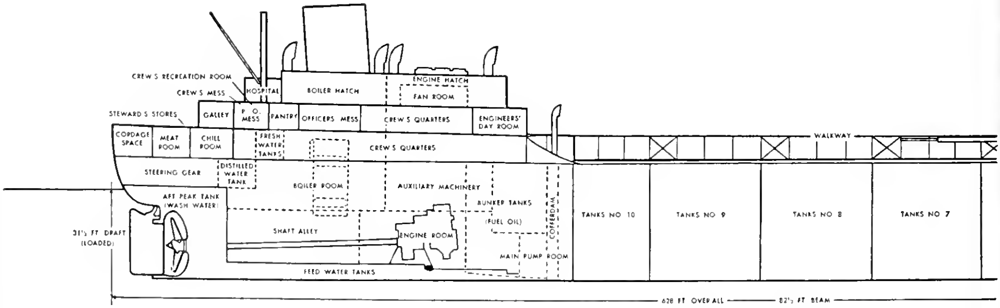
Pipelines are counted on to carry much of this load by moving crude from the Persian Gulf to the Mediterranean. But these pipelines are as yet unbuilt, and indefinite delay in completing them would throw the entire transport burden upon tankers. This would require new tanker construction on a scale far greater than now anticipated and at a cost in steel far higher than that of the pipelines. Furthermore, until the additional tankers were made available, it would probably prove necessary to withdraw a number of existing tankers from service elsewhere in the world or limit oil shipments from the Middle East.

A ship which carries a fluid cargo (whether petroleum, liquefied gas, vegetable oil, molasses or something else) is not necessarily a tanker. She may carry it in barrels or even in built-in tanks, but she does not qualify as a tankship unless her tanks are an integral part of the hull, or shell, of the ship. The first true tanker was a German vessel, the *Gluckauf*, built in England in 1886. Two years later came the *Standard*, first tanker owned by the original Standard Oil Company.

Bulk transport by water was then, and still is, the most economical method of moving oil long distances. That is one reason why the world's tanker fleets have grown steadily until this year they totaled approximately 21 million tons of cargo-carrying capacity. More than one-third of this total was accounted for by the famed T-2s of the U. S. Maritime Commission's wartime building

Adapted from an article entitled "Supertanker" in The Lamp, Standard Oil Company (New Jersey) publication

The interior arrangement of the ship is indicated in the profile below. Cargo space is set apart, fore and aft, by cofferdams, twin bulkheads with air space between. The larger tanks, designated as cargo tanks 1 to 10, run down the center of the ship. Abreast of them are the smaller port and starboard wing tanks numbered 1 to 10.



program.

Since they came into service, the T-2s have been a kind of yardstick with which other tankers were compared. At some future time, the yardstick may be the "supertankers," of about the *Esso Zurich's* size and speed, now being built for Jersey Standard and other U. S. tanker operators.

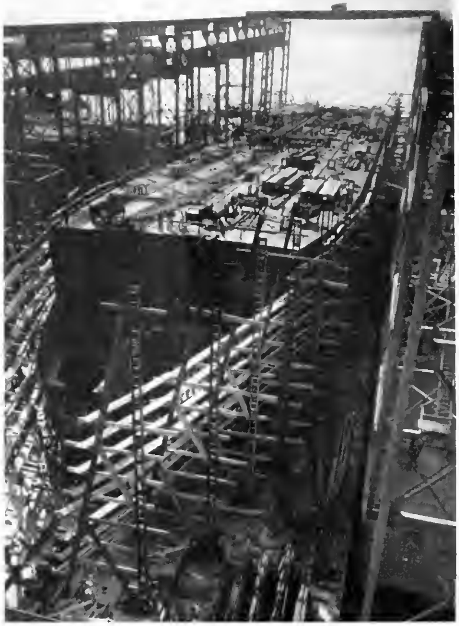
Here's how the *Esso Zurich* shapes up alongside a typical wartime T-2:

	T-2	Esso Zurich
Length overall (feet)	528	628
Breadth (feet)	68	82½
Draft, loaded (feet)	30	31½
Speed (knots)	15	16
Capacity:		
Tons	16,625	26,000
Barrels	138,335	228,000

A tanker, reduced to her essentials, is a collection of floating tanks, plus machinery to propel her and pump her cargo, and living space for her crew. The designer of the *Gluckauf* might be pleased if he knew that, sixty-two years later, tankers were still being built along the general lines which he conceived for the first petroleum steamer in history.

Nearly all tankers, ever since, have followed this plan. Their living and working space is at the after end, except for the midships house where the bridge and deck officers' quarters are located, and the forecastle or forward end where the windlass and anchor-chain hawse pipes are located. Amidships lie the cargo tanks, under a long deck so low that seas often sweep across it. Since there generally is no pasasge through the cargo space below this deck, a railed walkway runs about eight feet above it. These features give the loaded tanker her characteristic and unmistakable silhouette—three widely separated humps on a hull almost awash.

The oil tanker is unique among cargo vessels in that she is a one-way carrier. Her job is to move petroleum, whether crude or refined, to areas where it is in demand. Seldom, therefore, does she have a return cargo. When her tanks are empty, she rides the waves as lightly as a cork, and about as unmanageably; so on her return voyages sea water is pumped into her tanks as ballast, until

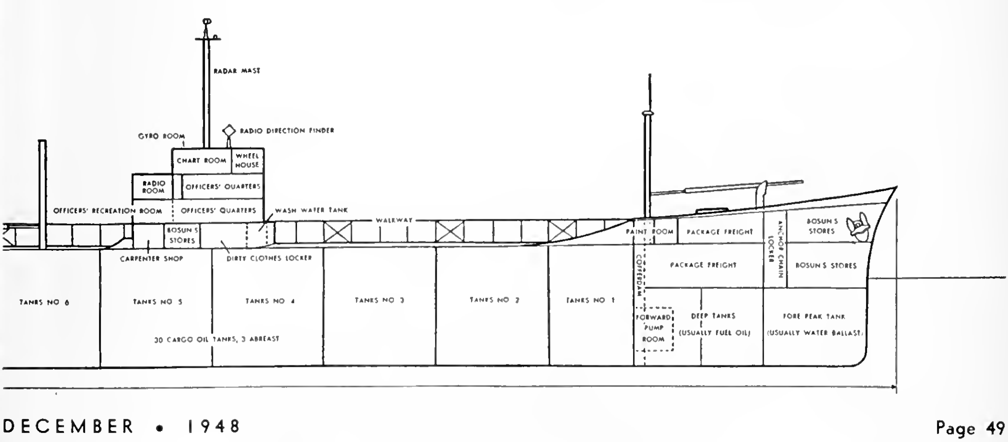


General view of the new tanker under construction on the shipway.

she has settled low enough to be satisfactorily seaworthy.

The tanker has no long, pivoted cargo booms on her masts or derrick posts, like those which distinguish a dry-cargo freighter. She has instead a complex maze of pipelines laid on her deck, with more below. From them rise handwheels, painted in different colors for easy recognition, which operate the valves controlling flow. Through these lines her batteries of pumps unload her liquid cargo.

There are "clean oil" cargoes and "dirty oil." Dirty, or



1 2 3 4 5

BUILDING A 26,000-TON TANKER

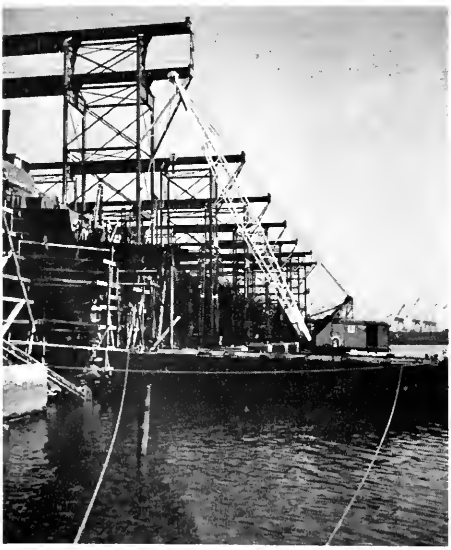
1. Workman tightening nuts on bolts before riveting operations. 2. Riveter drives a rivet into a riveted lap on the bottom of the ship. 3. Riveter using an air hammer to rivet steel plates in the hull. 4. Moving steel plates into position during the fabrication of the bow section of the new tanker. 5. The stern frame section of the new tanker.

black, oil is crude petroleum or a product like bunker fuel; clean oil is refined petroleum such as gasoline. The clean-oil tanker often has the problem of carrying a variety of products—gasoline of different specifications, fuel oils, lubricating oils of many grades, weights and colors—without mixing them up.

To do this, the pumpmen and the officers—especially the chief mate, who has a special responsibility for the cargo—need an exact mental blueprint of the ship's cargo system: every tank and pipeline, pump and manifold, header and crossover. All this euipment must be checked for leaks before loading and at regular intervals afterward. With well-trained men using careful procedure, a clean-oil tanker may carry six or eight grades of product without contaminating any of them.

Tanker cargoes are handled with remarkable speed.

Floating derrick used to attach stern frame to hull during the construction of the new tanker.



A fast turnaround (time in port) is a mark of efficiency and a major factor in keeping down the cost of the product transported.

A twenty-four-hour turnaround was once considered exceptional for a big oceangoing tanker. However, the average T-2 can pump some 10,000 barrels an hour and usually discharges an unmixed cargo in fifteen to twenty hours. The *Esso Zurich's* four cargo pumps, steam-turbine-driven, will pump 22,000 barrels an hour. Her turnaround time, with a cargo more than half again as large as a T-2's should be even shorter.

Gradual improvements in hull design and in propulsion machinery, over many years, have made possible the usful operation of a tanker so big and fast.

In the economics of bulk oil transportation by water, the aim is to minimize the "cost per cargo ton per mile." The more oil a tanker carries and the faster she steams, loads and discharges, the more cargo she will transport during her useful lifetime. On the other hand, if size and high speed send her operating costs up too sharply, some of the power will be wasted.

Of course, her size may be limited by the harbor conditions and terminal facilities in ports where she is expected to call. She might, for example, be needed to deliver products to ports along the west coast of Central America. Here are few deep-water harbors into which any ship can steam with impunity, so the tanker used in this trade must be of limited draft.

Even if her trade is to be only among the larger oil ports, a few feet of deeper designed draft might mean that she would be denied access to some of them, when fully loaded. So, when a new tanker is to be designed by Jersey Standard's marine department, one of the first considerations is to find out where she is to go and how big she may be within limits set by harbor and terminal facilities.

For all her bulk, it is worth noting that the *Esso Zurich*, fully loaded, draws only about a foot and a half more water than a T-2. There will be few harbors or terminals available to the T-2s where the new supertankers cannot call. As queens of the world's largest privately owned tanker fleet, they will serve the oil-consuming world wherever petroleum is to be moved by sea.

Tanker Freight Rates

By OSCAR J. BEYFUSS**

TODAY the question is often asked, "Do the tanker charter rates fluctuate widely?" Let us take an example, prior to the influence of World War II of that active trade Gulf to United Kingdom and Continent where many clean charters were made.

Over the decade 1926-1936 this typical trade had its upward movements to sharp peaks in freight rates, sharp declines and level stretches. The details might be worth examining. During most of 1926 rates were close to 28 shillings per ton.* In the latter part of that year they ranged sharply up to 50 shillings, took a little drop of about ten per cent during that winter and climbed up to 50 shillings again in the spring of 1927. By September of 1927, however, rates had taken a dive and were down to 16 shillings. With a little fluctuating of 3 or 4 shillings either way they did not change until the early part of 1929. Here again rates advanced so that in the early part of 1930 they again stood at 50 shillings.

Within a short six months charters were being consummated at 12 shillings. For five years (1931-1936) the rates ruled in the comparatively narrow range of 8 shillings to 16 shillings. Dirty rates in this same trade followed almost the same pattern but the peaks were not quite as high.

Other trades, like our transpacific (mostly Japan discharge), followed a very similar trend with almost the identical ups and downs. The same is true of most regular trades.

In the strictly American trade between United States Gulf Ports and the ports north of Cape Hatteras, the barometer for dirty tankers is based on crude of 30° or lighter. In the same years, 1926-1936, it might be well to examine this trade which also followed a similar up and down pattern, but it is more simple to take the averages so we find the rates during 1926 and 1927 were 31½ cents to 32 cents per barrel, but the next year they had dropped to 17 cents on the average. 1929 and 1930 rates averaged 30.8 cents and 28.3 cents, respectively. For the net three years the averages were in the narrow range between 14.4 cents to 15.1 cents. The next two years (1934-1935) the rates were slightly upward, being 18.5 cents and 18.2 cents. to be followed in 1936 by an average of 23.8 cents.

The Maritime Commission during World War II promulgated rates for all trades so that after the war these rates were used while Governments controlled

Oscar J. Beyfuss

tanker tonnage. The effect of the free markets began to make itself felt late in 1947. By February of 1948, the effect of the greatly accelerated requirements for petroleum products in the world markets had advanced the charter rates to the peak of 250% above the Maritime Commission rates. A month or so later rates had dropped to about half of the peak, and within six months the charters were being announced around 25% *below* U. S. Maritime Commission rates.

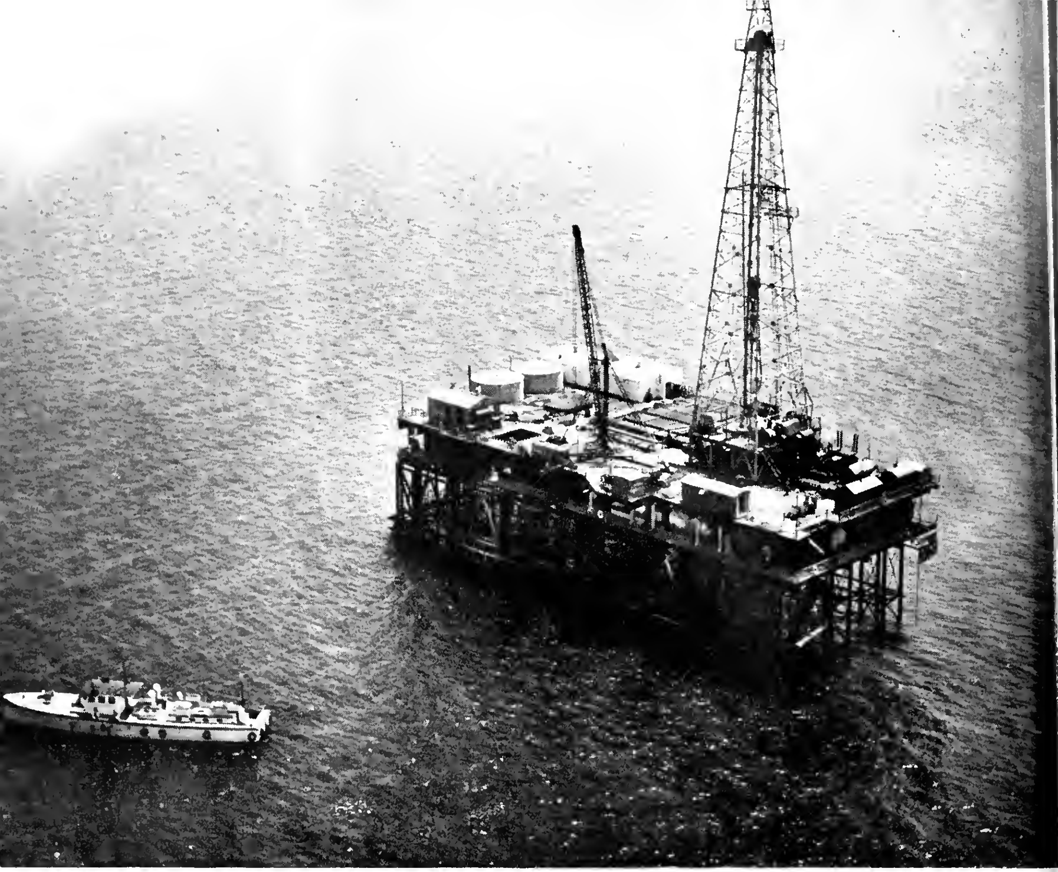
The foregoing deals only with voyage and multiple voyage chartering. During the period from the free market to date, time charters mostly for 5 year periods have held in the narrow limits of about $4.50 to $3.50.

The active trades have changed since the War. Europe formerly received her petroleum products from the Caribbean-Gulf area, supplemented by Black Sea and a little from California. Now the European requirements are being largely filled from the Persian Gulf or the refineries in the Eastern Mediterranean.

The length of voyages in many cases has been largely increased, and this, together with the tremendous growth of the use of petroleum products both at home and abroad, will require a vast tonnage. Today we have built and are building numerous tankers of great carrying capacity not even thought of before the War.

* Prior to World War II, most of the negotiations for freights in world trades were done in British Sterling.

**The author is a ship and oil broker in San Francisco and had extensive experience in handling the tanker program during the war.



Oil is being sought in 50 feet of water eight miles off the Louisiana coast from the $1,200,000 drilling platform.

Underwater Search For Oil in Gulf

IN MANY of he coastal areas of the United States and elsewhere the search for oil continues endlessly, presenting problems that are never met in other types of prospecting. Through the courtesy of the American Hoist and Derrick Company, some of the structures used in offshore drilling and some of the problems encountered are outlined herein.

It requires a big structure to support a drilling rig in 50 ft. of water over an unstable bottom, especially in such waters as those of the Gulf of Mexico where the equipment, including quarters for the crew and a considerable stock of supplies, must face some of the world's worst weather. Gales may reach 120 miles per hour, driving waves 35 feet high.

From the structure shown above it is possible to drill seven wells. It has two half-acre decks which hold a complete rig for drilling and comfortable living quarters for 54 men.

Arrayed on the top deck are quarters, racks for 15,000 feet of drill pipe and long strings of casing, and the specially reinforced derrick. This lattice of grey steel, unassisted by guy wires, was designed to withstand hurricanes and has nearly twice the strength of its land counterpart. The mud storage room, living quarters, and

well area on the lower deck are sheltered from offshore winds by thirteen fuel and water tanks on the seaward end of the structure.

Never before has anyone attempted to construct a stationary drilling island in fifty feet of water in the hurricane-swept Gulf of Mexico, where wind and sea fashion some of Nature's worst storms. There it must stand, anchored by its 100 piles, many of which bear up beneath loads of 250,000 pounds each, driven deep into the soft, silty clays below. Skin friction alone, between steel "H" beam piling and the soft alluvial soil, supports the 10,000,000 pound structure.

Sea Was Greatest Problem

From the first, the sea loomed as the greatest problem in constructing this drilling island. The forces of the Gulf, in deep water, were unknown. The Scripps Institute of Oceanography, U. S. Army Engineers, and others were consulted in gathering data on wave forces, wave height, and the frequency with which waves would strike the structure. The same oceanographer who forecast sea conditions for the Normandy invasion in 1944 was employed to study wave forecasting in the Gulf of Mexico. The results of these studies, together with the records of the U. S. Weather Bureau, unveiled the might and power of the elements.

From these data engineers calculated the forces expected to affect the structure, and tests were made on the bearing of the soil beneath the Gulf. Six core test holes, one from the top of a 24-inch pipe test pile driven into the Gulf, were drilled in the vicinity of Grand Isle, providing information and samples of soil formations down to about 400 feet. The soft soil required unusually deep penetrations for piling, and the piles were driven from 147 to 197 feet into the Gulf floor, yet far enough above the first firm bearing stratum to permit uniform settling of the entire structure.

Designing the structure required extensive investigation, as nothing comparable had ever been built before under such conditions or to resist such forces. After months of study, the most practical design proved to be a network of welded steel templets and braces mounted on piling. Templets are the 18-ton prefabricated sections which look like massive four-cornered ladders of pipe and serve as supports and guides for the piling. Turnbuckle rods and 8-inch pipe spacers between the templets brace the structure internally, topped by big 24- and 30-inch "I" beams supporting the treated timber decks. No guy wires or external braces of any kind help the structure resist the pounding of the gulf, thus permitting boats to approach from any direction. With this structure the Humble Oil and Refining Company is now actively drilling.

Maintaining Supplies Is Difficult Task

Supply is one of the most important considerations in the operation of a drilling rig eight miles offshore. Due to the lack of fresh water below ground, water for drinking and maintenance purposes, both on the structure and on Grand Isle, is one of the most pressing problems. It must be barged from New Orleans via the Mississippi River, a 24-hour trip. Food and drilling supplies also must be barged in or trucked the 120 road

(Please turn to page 100)

Top: The giant American Hoist & Derrick Company's Revolver Crane lowers a templet weighing 18 tons into the water. The templets are 10 feet square and 72 feet long.

Bottom: The pile-driver held by the American Revolver Crane drives the 10-inch steel piles 197 feet into the bottom of the gulf.

Naval Architects and Marine Engineers

Analysis of Papers
Read at 1948 Meeting in New York

Factors in the Design of Marine Boilers

By GEORGE W. KESSLER
of The Babcock & Wilcox Company

The design of marine boilers is a process of correlating basic design data to meet the characteristics prescribed by the naval architect. The process requires a thorough understanding of the expected operating conditions and the application of theoretical heat transfer and fluid flow data, modified as necessary by empirical factors derived from research on similar types of boiler units. Boiler design also involves stress analyses, consideration of fabrication and maintenance problems and a knowledge of developments in materials and other fundamental research.

Many factors influence the design and selection of boilers for a particular installation. These include customer preference, space and weight limitations, regulatory code requirements, operating conditions, basic performance requirements, general power plant design, available fuel and method of firing, means of supplying combustion air and procedure for evacuating the products of combustion from the furnace, water conditions and type of propulsion. Although all of these factors contribute heavily in the development of the design, they must be so correlated that the boiler proportions selected satisfy performance demands.

Competitive boiler designs are frequently compared by analysing performance criteria, particularly those based upon heat release and absorption rates. In general, with the exception of the furnace heat absorption rates, none of these design criteria is really satisfactory. However, they are all useful provided their limitations are clearly understood. In order to fully utilize the designer's talents he must not be handicapped with arbitrary restrictions which have no real importance as design criteria.

In design procedure the boiler designer uses the same fundamentals regardless of the steam pressure and temperature range, manual or automatic operation, or the requirements for additional heat reclaiming devices such as air heaters and economizers. Experience indicates where basic design data must be modified by empirical factors to account for size differentials, arrangements of surfaces and cleanliness of combustion gases. Experience also provides the balance between theoretical and practical design considerations which assures long time operation of economically designed boiler units with a minimum of maintenance and trouble.

In design analysis and the development of the boiler components—furnaces, water screens, superheaters, tube banks, economizers and air heaters—there is no set procedure which can be followed in all cases and by all designers. However, unless generalized design procedures are established the final development may involve the expenditure of time and labor far out of proportion to that actually warranted. In design procedures the all important relationship between temperature, heat transfer rate, and surface must be fully recognized. Further, considerations of the effects of the circulatory characteristics on boiler design, the disposition of heat absorbing surfaces and the effective use of pressure drop to minimize alloy requirements, and the arrangement of heat absorbing surfaces to minimize outages for cleaning and maintenance are of utmost importance.

In the final alignment of surface arrangements economic readjustments should be made to reduce boiler size weight and cost by utilizing each type of component surface to the fullest extent.

Model Tests on Tanker Hulls

By RICHARD B. COUCH
and MANLEY ST. DENIS
of the U. S. Navy David Taylor Model Basin

In view of the large numbers of oil tankers currently being constructed by the maritime nations of the world, and the present accelerated interest in tanker design in the leading shipyards of this country, with the resulting large number of requests for model tests at the David Taylor Model Basin, it was believed desirable to make immediately available to naval architects such pertinent data as could be assembled and published relating to the power performance of modern tanker hulls. Accordingly, permission was obtained from the designers of ten hulls, for which models were on hand at the David Taylor Model Basin, to retest these models and publish a comparison of the results. All of the vessels of the group are designed for approximately the same deadweight capacity, length, and speed, although they vary appreciably in hull form and propeller revolutions.

Since the factors involved in the choice of a hull form include considerations other than those known to the model basin, the basis for the comparison of the designs was limited to the effect of hull form on the resistance and power as determined from smooth water model basin tests.

To establish a common basis for comparison, all models were tested at the same displacement-length ratio of 152 and all data have been worked out to apply to a

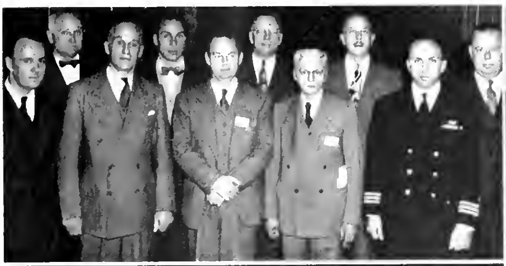
Top: Authors of technical papers presented at 56th annual meeting of the Society of Naval Architects and Marine Engineers, November 10-13, 1948, Waldorf-Astoria Hotel, New York City.

Front row: Douglas C. MacMillan, associated with George G. Sharp, Naval Architect; A. S. Thaeler, Asst. Marine Engineer, Pittsburgh S.S. Co.; Mark L. Ireland, Jr., Technical Dept., Newport News S.B. & D.D. Co.; John F. Roeske, Asst. Naval Architect, Sun Shipbuilding & Drydock Co.; Commander Lewis A. Rupp, Bureau of Ships, United States Navy.

Back row: Rear Admiral William A. Sullivan, U.S.N., Rtd.; Manley St. Denis, of David Taylor Model Basin; Harold F. Robinson, Chief Naval Architect, Bethlehem Steel Co., Shipbuilding Division, Quincy, Mass.; Richard B. Couch, of David Taylor Model Basin; George W. Kessler, Babcock & Wilcox Co.

Top: Winners of awards presented at annual meeting of the Society.

Left to right: William Binley and Commander Frederick A. Hunnewell, U.S.C.G., Rtd., awarded Fifty year Membership Certificates; Vice Admiral Edward L. Cochrane, U.S.N., Rtd., President of the Society; Vice Admiral Earle W. Mills, U.S.N., Chief, Bureau of Ships, winner of "The David W. Taylor Gold Medal"; C. Richard Waller, Vice President and Chief Engineer, De Laval Steam Turbine Co., winner of "The President's Award"; Matthew G. Forrest, Senior Assistant Naval Architect, Gibbs & Cox, Inc., winner of "The Captain Joseph H. Linnard Prize."



Bottom, left to right: John F. Metten, Chairman of Board, New York Shipbuilding Corp.; Homer L. Ferguson, Chairman of Board, Newport News Shipbuilding and Dry Dock Co.; Vice Admiral Edward L. Cochrane, USN (ret.), President of Society.

Bottom, left to right: W. John Kenney, Under Secretary of Navy, principal speaker; J. H. King, vice president of Babcock & Wilcox and of the Society, who served as toastmaster; Vice Admiral Edward L. Cochrane, USN (ret.) President of the Society.

600 foot vessel displacing 32,800 tons with a service speed of 16 knots. The models were towed for resistance and self-propelled with the propellers originally designed for the vessels.

The lines of the ten hulls together with the following test data are presented in the paper:

(a) The wave profile corresponding to the service speed of 16 knots.

(b) Curves of propeller characteristics obtained from open water tests.

(c) Curves of the following plotted against ship's speed.

(1) Effective horsepower (EHP)
(2) Shaft horsepower (SHP)
(3) Revolutions per minute (RPM)
(4) Wake fraction (w)
(5) Thrust deduction fraction (t)
(6) Propulsive coefficient (P. C.)
(7) True slip (S_t)
(8) Apparent slip (S_a)

The power and coefficient data predicted from the model tests results for all vessels at a speed of 16 knots are given in the table.

An analysis of the resistance and propulsion data has been made and certain conclusions drawn. Although the number of vessels in this group is too small to permit extensive generalizations, it appears justifiable to draw the conclusions that follow. It should be emphasized that these are valid only for the speed range of the tests and for the variation in form characteristics of the vessels in the group.

1. For a given length and displacement all variations of a design will have sensibly the same wetted area and thus the same "plank" frictional resistance.

2. The form resistance diminishes with increasing angle of entrance of the load waterline.

3. The optimum prismatic and waterplace coefficients decrease with increasing speed-length ratio. This is well known, but it should be noted how great a difference in resistance results from even a small change in the prismatic coefficient at the higher speeds at which wave making is important.

4. The optimum length of entrance increases with speed-length ratio.

5. A bulbous bow is advantageous at least at all speeds at which wave-making is not negligible.

6. At the speed-length ratio of 0.65 a rather wide vari-

(Please turn to page 83)

Election of Officers Society of Naval Architects and Marine Engineers

56th Annual Meeting, November 10, 11 and 12, 1948

President: John B. Woodward, Jr., President and General Manager, Newport News Shipbuilding & Drydock Corp.

Honorary Members: Sir Amos L. Ayre, The Shipyard, Burntisland, Fife, Scotland.
Vice Admiral Edward L. Cochrane, USN (ret.) Head, Dept. of Naval Architecture & Marine Engineering, Massachusetts Institute of Technology.

Honorary Vice Presidents: Arthur B. Homer, President, Bethlehem Steel Co.
Roger Williams, Chairman of Executive Committee, Newport News Shipbuilding & Drydock Co.

Vice Presidents for term ending December 31, 1951: C. W. Middleton, Director, The Babcock & Wilcox Co.
Capt. Harold E. Saunders, USN, Special Assistant to the Chief of the Bureau of Ships, Navy Dept.
George G. Sharp, Naval Architect.
Rear Admiral Henry Williams, USN (ret.)

Vice President for term ending December 31, 1949 vice Arthur B. Homer promoted to Honorary Vice-President: David Arnott.

Vice President for term ending December 31, 1950 filling vacancy incident to death of Rear Admiral C. A. Jones: Vice Admiral Earle W. Mills, USN, Chief, Bureau of Ships, Navy Dept.

Council Members representing Members and Associate Members for term ending December 31, 1951: Walter L. Green, James B. Hunter, Harvey F. Johnson—vice Harold E. Saunders promoted to Vice-President, John F. Nichols, W. Selkirk Owen and S. A. Vincent.

Council Member for term ending December 31, 1949, vice Earle W. Mills promoted to Vice-President: Charles D. Wheelock.

Council Members for term ending December 31, 1950 vice David Arnott promoted to Vice-President, J. B. Woodward, Jr. promoted to President and to fill vacancy incident to death of W. H. Collins: William Francis Gibbs, Daniel D. Strohmeier, O. B. Whitaker.

Council Members, representing Associates for term ending December 31, 1951: B. F. Campbell, Harold S. Falk and Albert V. Moore.

Treasurer: O. B. Whitaker.
Secretary: Wilbur N. Landers.
Assistant Treasurer: C. C. Knerr.
Assistant Secretary: Arlo Wilson.
Editor: H. H. Brown.

1949 EXECUTIVE COMMITTEE

J. B. Woodward, Jr. President, ex-officio, David Arnott, W. E. Blewett, Jr., Edward L. Cochrane, Homer L. Ferguson, Walter C. Hemingway, J. H. King, Emory S. Land, Emmet J. McCormack, John F. Metten, C. W. Middleton, Earle W. Mills, William S. Newell, Joseph W. Powell, H. Gerrish Smith, O. B. Whitaker, Treasurer, ex-officio.

John B. Woodward, Jr., President and General Manager, Newport News Shipbuilding & Drydock Corp., who was elected President of the Society of Naval Architects and Marine Engineers at their 56th annual meeting in November.

Heat Insulation in S.S. "Lurline"

By ARTHUR W. JOHNSON

Western Asbestos Company

INSULATION on the Matson Navigation Company's new *Lurline,* making operation of the vessel as economical as possible, was part of an $18,000,000 reconversion job which was finished early this year, resulting in a practically brand new vessel. (See the May issue of *Pacific Marine Review*). On the original trials of the *Lurline* in 1933 with everything wide open, the turbines generated 30,000 shp and drove the hull at a maximum speed of 22.5 knots. Fuel consumption figured at 0.625 pounds per shp. The success of the new insulation job was verified on the first voyage after reconversion in April, when records showed that although more steam equipment had been added, and high speed was maintained, the fuel consumption was commensurate with that of the ship prior to reconversion.

The power plant on the ship consists of 12 Babcock & Wilcox interdeck superheaters, standard marine type, water tube boilers, arranged in two boiler rooms and supplying steam at 360 psi and 650F. throttle to two sets of triple expansion Bethlehem-Parson turbines. Many tubes were renewed, particularly in the superheaters and brick work in the furnaces was completely renewed. All of the machinery in the engine rooms was also completely reconditioned. Main turbines were removed from the ship and made like new. All pumps were overhauled, cleaned and repacked. All steam piping and valves were inspected and gaskets renewed.

Due to complete rebuilding, all piping including low pressure steam and hot water lines was re-routed.

As a result of all this work, all steam generating and steam utilizing equipment, as well as hot water lines, etc., had to be reinsulated. Because the insulation which was installed when the *Lurline* was first built was found to be in good condition, specifications similar to those employed originally were used for the reconversion insulation.

Equipment which operates at temperatures of 600F. or less was insulated with 85% Magnesia. Where temperatures are higher, a combination insulation was used consisting of an inner layer of diatomaceous silica insulation and an outer layer of 85% Magnesia, thickness of the inner layer being sufficient to reduce the temperature at its outer surface to less than 600F. Use of this combination insulation takes advantage of the low thermal conductivity of the magnesia insulation and the resistance to high temperatures of the diatomaceous silica.

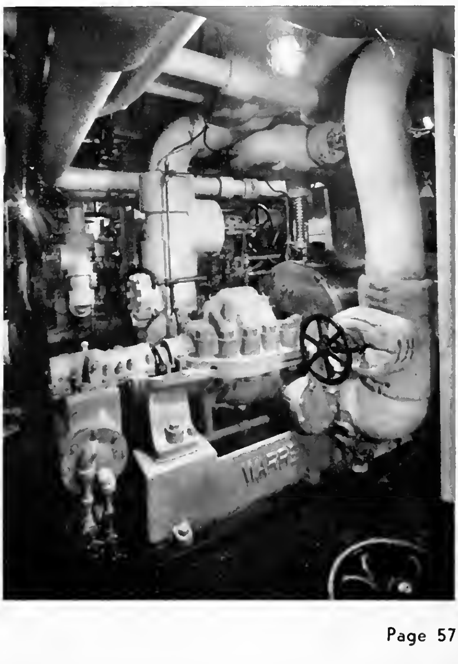
Table 1 lists the thicknesses of insulation used on piping. These were chosen on the basis of operating temperatures, what the steam is to be used for, pipe size, etc.

Insulation Application and Finishing

To obtain the best service from the insulation, all possible steps were taken to insure a close, tight fit. Before insulation was applied, pipe and equipment surfaces were cleaned of all dirt, scale, debris, etc., that had collected during the reconversion work. Semi-cylindrical sections or segments of insulation, depending upon the diameter of pipe involved, or blocks, in the case of equipment, were wired in place with all joints butted tightly together. Where double layer construction was used, joints in the outer layer were staggered with respect to the joints of the inner layer so that there would be no direct path for heat escape.

Joints, crevices, low spots, etc., in each layer were filled in with either cement or scrap made of the same

Lines leading to and from main feed pump in engine room insulated with 85% magnesia and removable blankets.

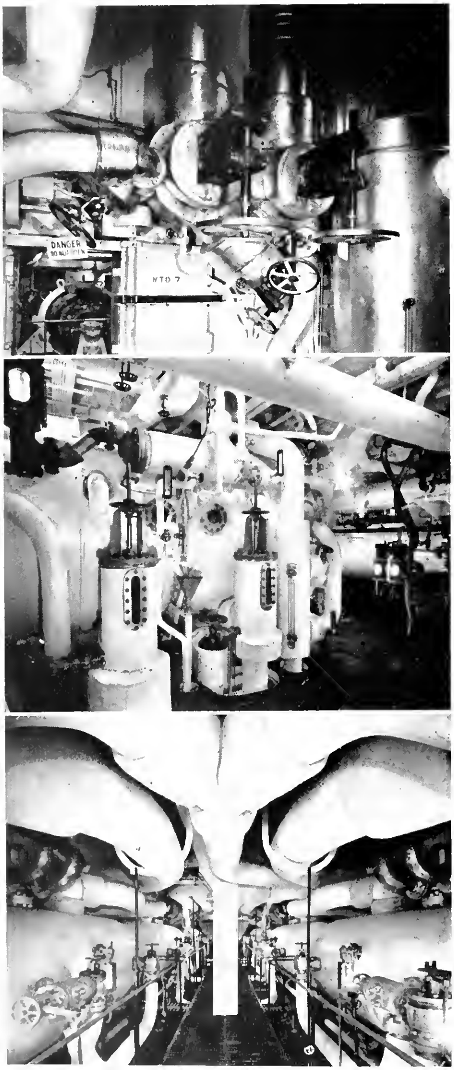


Top to bottom:

Main steam valves between boiler and engine room insulated with a combination of diatomaceous silica and 85% magnesia insulation and removable blanket type insulation.

Side view of magnesia insulated main evaporator. The insulation is finished with a sewed asbestos jacket, sized and painted.

Steam piping in boiler room insulated with a combination of diatomaceous silica and 85% magnesia pipe insulation. The insulation is finished with a sized and painted asbestos jacket sewed on with copper wire. The six feed water tanks are insulated with 85% magnesia blocks, finished with asbestos jacketing.



material as the insulation of that particular layer, either diatomaceous silica or 85% Magnesia.

Insulation on equipment was given a coat of asbestos cement. To serve as a foundation for the cement, wire

TABLE I—PIPING INSULATION

System	Operating Temperature	Material	Thickness	Finish
Main Steam	690F	Diatomaceous Silica	1½ in.	Asbestos Jacket
		85% Magnesia	2 in.	
Emerg. Diesel Exh	650F	(same)	1½ in. 2 in.	"
Hot Fr. Water	120F	85% Magnesia	Standard	Cotton Lagging Tape
180° A.C.H.W.	180F	"	"	"
240° A.C.H.W.	240F	"	"	"
L.T. Fd. Water	150F	"	"	"
H.T. Fd. Water	200F	"	"	"
Hot Fuel Oil	200F	"	"	"
Gland Steam	360F	"	"	"
150 Steam	370F	"	"	"
35 Steam	370F	"	"	"
Aux. Stm. Drains	280F	"	"	"
H.T. Fd. Water	310F	"	1½ in.	"
Desup Steam	450F	"	"	"
240 Steam	420F	"	"	"
150 Steam	370F	"	"	"
35 Steam	370F	"	"	"
Desup Steam	450F	"	2 in.	"
240 Steam	420F	"	"	"
150 Steam	370F	"	"	"
40 Steam	370F	"	"	"
L.P. Bleed & 10 Steam	240F	"	"	"
H.P. Bleed	400F	"	Double Standard	"
S. W. Circulating	55F 80F	Wool Felt	½ in.	"
Plumbing Drains in way of Ceilings and Sheathing	55F 100F	"	"	"
Fire and Sanitary	55F 80F	"	"	"
Cold Fresh Water and S.W. Flushing	55F 80F	"	"	"

mesh was first stretched over the blocks and firmly wired in place.

Insulation on hot fresh water piping to plumbing fixtures, hot water supply and return piping to air conditioning, steam piping to distillers, air conditioning preheaters, hot water heaters, and culinary steam piping to galley and pantries, was finished with cotton lagging tape and cemented in place with a rosin emulsion base cement which is fire-retardant and waterproof. A layer of rosin-sized paper was used under the tape finish in toilet and shower spaces for further protection against wetting of the insulation.

Insulation on all other piping, such as high pressure steam, etc., was finished with an asbestos cloth jacket sewed with No. 19 copper wire, thus providing a tight fitting, good looking job that is fire-retardant. The jacketing was coated with the fire-retardant, waterproof cement mentioned above, after which the lines were painted.

Pipe insulation that requires protection against

(Please turn to page 90)

Pacific World Trade
Reg. U. S. Pat. Off.

Rio Port Authority Asks Better U. S. Shipping Procedures

Brazilian importers have three main complaints about the way U. S. goods are shipped, according to the Brazilian Government Trade Bureau which lists 1) inadequate packaging or crating; 2) deficient addressing; 3) haphazard loading.

"We have the impression," the statement said, "that U. S. exporters are using for Brazilian shipments the same kind of packaging they use for domestic trade. Obviously cardboard boxes that serve for truck or train transport are not so good for shipment to Brazil, since they must be loaded and unloaded and to save space are compressed aboard ship. As a result the boxes are broken and pilfering is increased."

The Port Authority added that since these cardboard boxes are usually of small size, they make for a great deal more work in unloading, which in turn increases the risk of damage. It estimated that because of differences in size it takes about 27 more operations to unload such U. S. cargoes than to unload better-packaged cargoes from Europe.

Increases Storage Task

The habit of shipping in cardboard containers, it was pointed out, increases the storage problem of Brazilian warehouses, as the fragile boxes cannot be piled on top of each other to any extent and the upper part of the warehouse must be left empty. Stronger packaging would increase warehouse capacity by about half, the Port Authority estimated.

Bad addressing and identification, the statement said, frequently slows down shipments. "Some of these boxes are so written over that they look like pages from a book. They list weights and measures in feet and meters; they carry all sorts of recommendations, advertising, factory addresses and what-not. But the main things, the destination, the correct markings and numbers, are lost to view. They are not written outstandingly; and sometimes they are just jotted down in pencil. Obviously, this slows down the identification of goods as well as unloading and warehousing."

The Port Authority said that sometimes several thousand boxes come in, all jumbled, of which a variety of importers would each receive several hundred. Hours have to be spent in sorting them out, while if they were loaded together it would be a simple job. The present method means that parts of one lot may be unloaded over several days. Afterwards the thousands of individual cartons have to be sorted again from warehouse piles.

"A little method in loading, in U. S. ports, would greatly facilitate unloading in Brazil," the statement concluded, "and would lower port costs as well. Undoubtedly these factors greatly influence port congestion. The goodwill and cooperation of U. S. shippers will help solve the problem for our mutual benefit."

Annual Report Of Board of Harbor Commissioners, Los Angeles

Recently issued by the Board of Harbor Commissioners of Los Angeles is their Annual Report for the fiscal year ending June 30, 1947. This is the first Annual Report to be published since the one issued before the war for the fiscal year 1940-1941.

The Report contains several beautiful photographs of the Port and Port activities as well as important statistical charts which tell the story of its development.

The history of the Port of Los Angeles is described in this booklet as well as the part played by the Port during the war years. During the war years (July 1, 1941 to June 30, 1946) a total of 14,960 commercial cargo vessels arrived at the port. Total tonnage of commercial cargoes handled through the port during this five-year period was 88,667,989. During the fiscal year covered by the report (July 1, 1946 to June 30, 1947) a total of 2,728 commercial vessels arrived at the Port, carrying 15,443,689 tons of cargo.

All phases of port activity are described in detail in this complete story of Los Angeles Harbor. Included are United States Government facilities; State of California agencies cooperating with the Port; description of wharves and transit sheds, the acrivities carried on by the Harbor Engineer's Office; warehouse facilities; cargo distribution; description of Harbor Belt Line Railroad; oil development and its handling by the Port; fire protection, dry docks and shipbuildiing; the Marine Exchange, yachting; San Pedro-Terminal Island Ferry; products handled through the Port; fishing.

The financial and statistical report of the Port completes this extensive review.

Television Sets Shipped To Rio

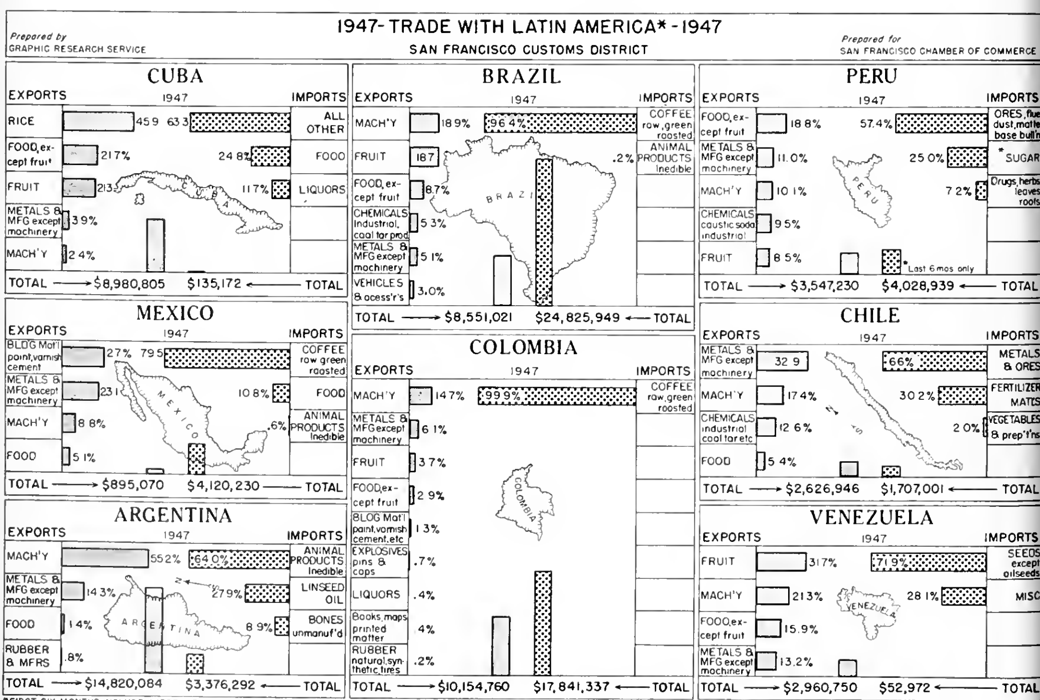
The ever-increasing interest in television has spread to Latin America, according to reports received by Moore-McCormack Lines, and has resulted in the first shipment of television sets to Rio de Janeiro, capital of Brazil. Although there are no facilities at present for actual use of the sets, they will be placed on display at the International Exposition for Industry and Commerce at the Hotel Quitandinha in the suburb of Rio, where they will be inspected by visitors to the exposition.

Television sets being loaded aboard the Argentina.

L. A. Foreign Traders Elect Directors

Members of the Foreign Trade Association of Southern California elected eight directors at their annual meeting in Los Angeles on December 2.

Directors include B. D. Blanchard, Richfield Oil Corporation; W. B. Bryant, General Steamship Corporation; N. E. Dunnavant, Commercial News; G. E. Hempshire, Balfour Guthrie & Co.; R. W. Hemphill, Hemphill Travel Service; S. J. Hindle, American President Lines; J. W. McCormick, Union Pacific Railroad; E. D. Peralta, Western Union Cable System; W. Shore, Hamilton Co.; S. D. Smith, Pan American Airways; P. Stein, customs attorney, and E. W. Stevens, W. J. Byrnes & Company of Los Angeles.



*FIRST SIX MONTHS INCLUDE WATER, AIR, RAIL & POSTAL SHIPMENTS

Source BOARD OF STATE HARBOR COMMISSIONERS-US DEPT OF COMMERCE

*LAST SIX MONTHS ARE WATERBORNE SHIPMENTS ONLY

Swedish Consul Speaks Before Jr. Foreign Trade Ass'n of Southern California

The Junior Foreign Trade Association of Southern California has resumed its weekly meetings beginning with the meeting at the Clark Hotel on November 9. Speaker at this meeting was Walter G. Danielson, Consul of Sweden, who gave a "Report on Scandinavia" covering the economic and social phases of Norway and Sweden.

Danielson pointed out that this area has a limited supply of dollars because of unprecedented spending after the war. Because of domestic needs and the responsibility of fulfilling commitments to neighboring areas, he said, export to the United States is not possible, and present import tariffs preclude competitive prices on the U. S. market for available merchandise. He further stated that while their social systems are far in advance of other countries, these benefits have resulted in high income tax rates, and also red tape in the form of permit requirements, bureaucracy and regulatory decrees.

Groups at the right were snapped at the meeting of the Junior Foreign Trade Association of Southern California on November 9. The speaker, Walter G. Danielson, Consul of Sweden, is shown in the top picture. ►

When Lurline Returned to Service

This traditional Hawaiian pig board was presented to Captain Frank A. Johnson, master of the Matson luxury liner Lurline, by the Hawaiian Civic Club. It was used in the colorful luau which welcomed the Lurline back to Hawaii on her maiden voyage last April. The inscription on the pig board reads: "This hand carved pig board of native Koa wood held the traditional offering of food in the Hawaiian ceremony of prayer for the Lurline on her return to peacetime service. Honolulu, April 21, 1948." This photo was taken in Captain Johnson's office aboard the Lurline.

R. L. Stakeman

--With The

Portland Port Engineers

Plastic bottom paints were all right for the Navy during the war but their value to peacetime commercial operation of ships has proved costly. This, in substance, is what Quentin Herwig, president of Marine Service, Inc., Seattle, told the Portland chapter of the Society of Port Engineers at a Portland Transportation Club dinner meeting November 11.

The experiment of using plastic bottom paints resulted in many ship owners finding it necessary to remove the plastic and to recoat with conventional com-

Port Engineer of the Month

LONG BEACH
R. L. STAKEMAN
OF PACIFIC FAR EAST LINE, INC.

A follower of the sea ever since 1918, Dick Stakeman has been on ships at sea and in many shipyards where he has had wide experience in the marine field in ship operation and in ship construction.

Dick was with the old Dollar Steamship Company for seven years. He was on the *President Wilson* and also the *President Coolidge* when that vessel first came out of the yard. When Consolidated Steel Company first began building ships in 1941 he began work with them as chief trial engineer, and with their expansion he was appointed general foreman of machinery in charge of all machinery installation and tests on the outfitting docks.

Dick was associated also with a small steamship company as marine superintendent and with Stone and Webster Engineering Company as mechanical supervisor. He became port engineer for Pacific Far East Line's Long Beach office in 1948.

Los Angeles-Long Beach Meeting

A talk by F. H. Drew of Westinghouse Electric Corp. on "Steam Turbines in the Marine Industry" drew a fine and representative group of shipping men to the Port Engineers meeting at the LaFayette Hotel November 3. Noted in the audience were the following:

Roy Campbell, Federal Paint; Bill Harrington, Bethlehem; George McCoy, Marsol Corp.; H. W. McEwing, American Pacific; Walter Richards, Wilmington Iron; Ray Jones, General Petroleum; Dick Stakeman, Pacific Far East Lines; S. M. Scanlan, P. M. Shipley and W. L. Budge, all of Westinghouse; Joe Wosser, Matson; Bert Hale, Marsol Corp.; Harry Summers, American Bureau (ret.); Hamp Neergaard, Burns Steamship; Glenn Gulvin, American Pacific; F. Shea, Bethlehem; Cy Cyrus, Union Oil; John Black, American Bureau; George Hoxie, American President Lines; Frank Boomer, Lloyds; Bing Miller, American Bureau; Al Maloney, Bethlehem; George Bradford, World Wide Tankers; Jack Gilbride, Todd; Joe Hare, Maritime Commission; C. P. Snively, American Pacific; Capt. A. P. Brown, Todd; Shipfitter Edward Pike; J. O. McDonald, General Petroleum; Bill Kane, Todd; Dan Dobler, Texas Co.

Many of the above are in the picture at the bottom of the page. On the opposite page is a picture of Mr. Drew and others who were at the speaker's table.

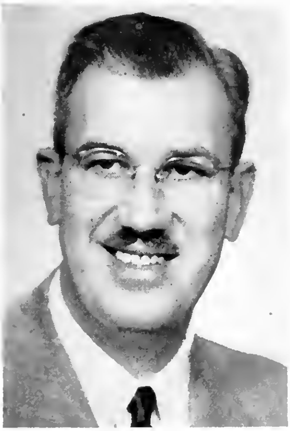
Port Engineers-

positions, according to Herwig.

Herwig said conventional bottom paints are designed to be easy to apply by brush or spray under almost any weather conditions and at an economical cost, and they afford resistance to corrosion and fouling for a greater period of time than the average out-of-drydock period of a ship in commercial operation.

Conventional bottom compositions, under normal circumstances, should not require a sandblasting job in less than twenty years on a freighter, and perhaps ten years on a tanker, the speaker said.

Herwig emphasized the necessity of proper bottom cleaning before application of bottom paints. He advocated hand-brush application as against spray; the same



Quentin A. Herwig, speaker at meeting of Portland Society of Port Engineers.

number of coats of primer for coating bare areas in drydock as are specified for a new hull or a sandblasted bottom. He also urged the sandblasting of the bottom and boottop plating in new ships to remove mill scale and permit better adhesion of priming coats.

Proper supervision of marine painting jobs and the importance of following the advice of the paint manufacturer were points stressed to avoid costly errors in application.

B. A. Young

Port Engineer of the Month

SAN FRANCISCO
BERNARD A. YOUNG
OF STANDARD OIL COMPANY OF CALIF.

"Barney" Young joined Standard Oil in 1921 as a first assistant engineer, serving on company ships, including the S.S. *F. H. Hillman.*

He attended the University of Santa Clara and Stanford after which he entered service with the Navy during World War I.

In 1923 "Barney" went ashore at San Pedro to take over the position of marine repair inspector and marine operator for Standard of California. He was transferred to San Francisco in 1930 as repair inspector on construction and repairs, and in 1934 he became Superintendent Engineer for the company's Marine Department, the position which he now holds.

Pictured at Los Angeles meeting.

Left to right: W. L. Budge, Steam Service Supervisor, Westinghouse Electric Corp.; P. M. Shipley, Port Engineer, Westinghouse Electric Corp.; Joe Wosser, Matson Navigation, President of Los Angeles-Long Beach Society of Port Engineers; S. M. Scanlan, Engineering & Service, Westinghouse Electric Corp.; F. H. Drew, speaker, Steam Superintendent —Pacific Coast, Westinghouse Electric.

Port Engineers of Puget Sound

The November meeting of the Society of Port Engineers of Puget Sound honored Captain George W. Callbeck, U.S.C.G., who recently took over Capt. Hill's post as head of marine inspection. The meeting was presided over by Sid Smith of the American Bureau of Shipping. Smith introduced Comdr. Arthur Dickert who welcomed Captain Callbeck in behalf of the Coast Guard officials. Numerous expressions of praise for the fine job of the Coast Guard on Puget Sound were volunteered by shipping men present.

Howard Perry of General Electric led a discussion of turbines, steam and gas. His talk featured a brief history of the development of the turbine, followed by a color film, "Power By Which We Live", produced by General Electric.

Top to bottom:
Front Row: J. O. Brown, J. Banner, T. F. Kane, G. W. Callbeck, A. L. Dickert, Herb Peters, L. H. Hirschy. Back Row: John C. Freeman, Ernest W. Ruef, Emery H. Joyce, G. C. Streng, J. J. Cadogan, Victor V. Miller.

Left to right: J. M. Clark, L. H. Hirschy, William Macdonald, Captain R. A. Johnson, Charles McMahon, M. W. Felton.

Right side of table, left to right: R. C. Storrs, J. F. Robertson, J. D. Wilson, C. E. Gannon, J. P. Robb.

Left to right: F. H. Howard, Al Solibakke, Tom Kane, Victor Miller.

Top to bottom:
Speakers table, left to right: Earl N. Story, USCG; Commander Arthur L. Dickert, Officer-in-Charge, USCG, 13th Naval District; H. E. Lovejoy, Puget Sound Freight Lines; H. M. Perry, General Electric; S. K. Smith, American Bureau of Shipping; Captain G. W. Callbeck, USCG; R. C. Black, General Electric; Ben Wilcox, Socony Paints; E. M. Johnson, General Electric; Ronald R. Askren, USAT.

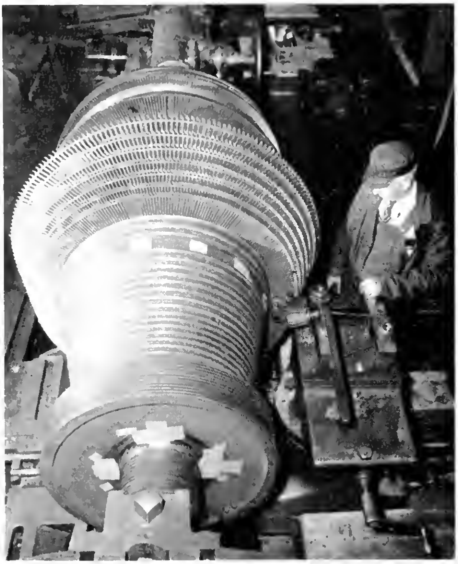
Anton Anderson, L. Simonson, Herb Peters, Fenton K. Young, A. H. McDonald, Merle A. Johnson.

Around the table, clockwise: John Elkins, Earl Lariviere, E. L. Marquat, John Freeman, George Streng, Lee Moyer, Captain Story, W. J. Knowles (standing), J. Banner, J. J. Cadogan, E. H. Joyce, Ed Ramey, R. C. Owen, C. D. Singer.

On the Ways

New Construction—Reconditioning—Repairs

Rebladding Turbines at Bethlehem Yard



Cutting tool removing old blades as rotor turns in lathe.

13,861 Blades in This One

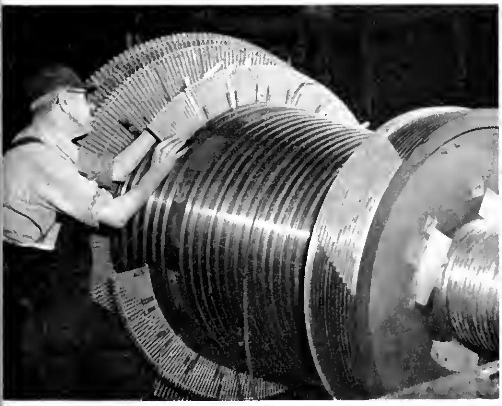
8,932 new blades on the rotor—

4,929 new blades on the lower half of the casing—

This reblading operation was recently completed on he low pressure turbine of the tanker S. S. *Stanvac* *Calcutta* at Bethlehem, San Francisco. This vessel, which s operated by Standard Vacuum Oil Company, was built it Bethlehem's Sparrow's Point yard. The reblading job was made necessary by the turbine bearings becoming overheated through accidental failure of lubrication. This caused the rotor to rub and thus damage the rotor blades and the blades in the lower half of the casing.

In addition to this large turbine job, two other turbine rotors were being rebladed in the yard's machine shop at the same time, indicating the yard's available manpower for carrying on a large number of turbine reblading jobs at the same time. These were from the Army Transports *Frederick Funston* and *James O'Hara,* now undergoing modernization-conversion by Bethlehem, discussed in an accompanying article.

Reblading LP rotor.



Reblading lower casing.

Reblading "Funston" and "O'Hara"

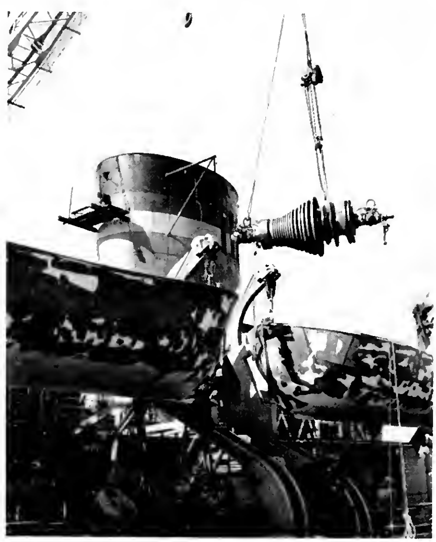
To take advantage of an improvement in blade design, which is expected to result in greater strength, safety and operating efficiency, the Army recently decided to reblade with new 13% chrome blading the low pressure turbine rotors on two of its transports now undergoing modernization-conversion at Bethlehem San Francisco. The two transports are the *Fredrick Funston* and the *James O'Hara*, both C-3 type vessels which were completed during the early part of the war. Each engine on these two vessels has a rated horsepower of 8500, with an overload to approximate 9300.

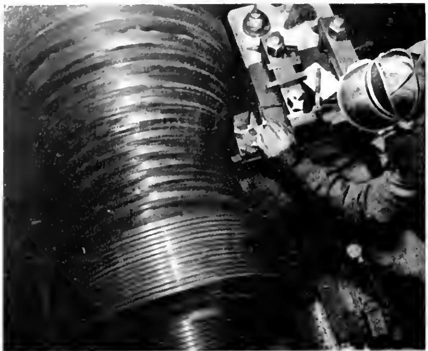
Although the reblading of turbines of all sizes is an old story for the San Francisco yard, each is a painstaking and exacting job—and this was no exception. The job on each rotor included machining out the old blading on rows 1 through 15 and the third row rateau astern; regrooving the spindle to make room for the new locking; machining the shrouds to design clearance; balancing the spindle; re-installing the rotor in the casing. In addition, each individual blade had to be machined to proper length.

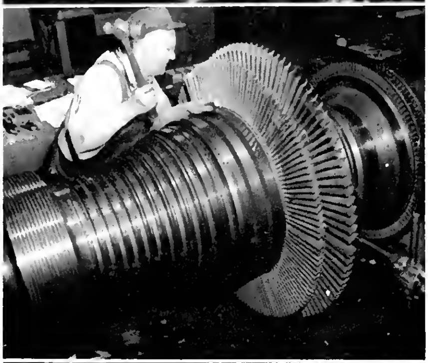
The entire reblading operation was performed in the yard's machine shop under the supervision of Morris Weitzner, chief engineer at the yard, Felix Conlin, General Machine Shop Foreman, and Peter MacDonald, Machine Shop Foreman.

Major basic items for the conversion of these two vessels include installation of a thermostatic fire detection system; extension of the Walter Kidde CO_2 smoke

Rebladed turbine rotor being hoisted aboard the Funston for reinstallation.







Top to bottom:

Regrooving LP rotor prior to installation of new type blades. This is done with a tool bit as rotor turns in lathe.

Reblading LP rotor with new type blades.

Grinding tips of one row of blades to design clearance while rotor turns in lathe.

"Humuula" Undergoing Repairs At Bethlehem

Back for the first time in the yard that built her 19 years ago, the SS *Humuula*, (opposite) Inter-Island Steam Navigation Company freighter and passenger vessel is shown on drydock at the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division. The vessel is currently undergoing grounding and collision damage repairs and minor voyage repairs.

Built by the yard in August, 1929, the *Humuula* is a single screw vessel, 217 feet long and of 961 gross tons. During the war she received a War Shipping Administration citation for meritorious service in ferrying troops and supplies between Honolulu and Johnson, Palmyra and Canton Islands.

detecting and fire extinguishing system; installation of all latest navigational equipment including the new Radiomarine commercial type radar; new furniture, fixtures and fittings throughout the ship; and the installation of new motor drive topping lift winches (Lakeshore Engineering Company) and a 30-ton boom at number 1 hatch for heavy lifts.

All machinery was inspected and certified by the American Bureau of Shipping and the United States Coast Guard. New hospital equipment and a new operating room, dispensary, pharmacy and diet kitchen also are included.

Upon completion, the vessels will be classified A-1 and AMS by the American Bureau of Shipping and will meet all requirements of sub-chapter M of the Coast Guard and will be certified by the Coast Guard to carry approximately 1200 passengers.

Conversion of the *Frederick Funston* is expected to be completed by the 15th of December. Completion date for the *James O'Hara* is set for February of next year.

Contrast

Three former U. S. Navy crashboats present an interesting contrast with three larger vessels in the background repairing at Todd Shipyard's Brooklyn Division. The trio of subchasers are to be conve rted for ferry service to carry workers from Gulf ports to tideland oil wells.

Todd Lengthens Tanker

The Todd Hoboken shipyard has completed the addition of a 42.6-foot mid-section between the two halves of the oil barge, *Poling Bros. No. 2*. The operation increases its carrying capacity from 6,000 bbl. to 10,000 bbl., according to its owners, Chester A. Poling, Inc., of New York City.

The vessel was formerly 175 feet long, and of 576 gross tons, with 8 cargo tanks. It is now 217.6 feet long, of approximately one-third more gross tonnage, and has 12 cargo tanks of about 38,000 gallons capacity each.

A Higgins cutter neatly slices the vessel in two in the middle of the No. 3 tank. The cut was 96 feet around the vessel. Here the cutter is guided along a track on the ship's bottom.

The slicing operation was performed within one week. The new mid-section, with two whole tanks and four halves, was prefabricated at another drydock. The vessel was severed with a Higgins cutting machine through the No. 3 midship tanks. The internals were burned away individually with torches.

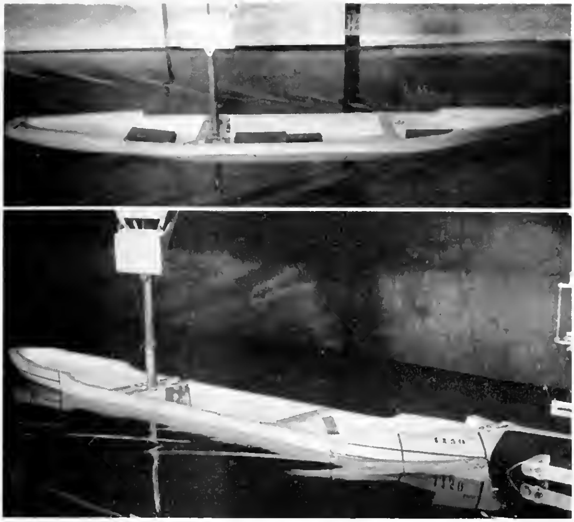
After the two halves were seperated, the stern was lashed to the drydock and lowered with it. The bow half was towed out into the basin and the new mid-section was maneuvered into place against the stern section. The bow was then returned and fitted perfectly against the forward end of the new mid-riff and the three pieces were bracketed, then welded together. For further strengthening two 60' long and 24" wide straps along

The bow is returned to place, to be fitted neatly onto the new mid-section.

the sides, were tack-welded port and starboard, just under the bulwark rail. All of the severed cargo piping, steam smothering, and electrical lines were lengthened and rejoined. New hatch coamings for the additional four tanks were installed, and ladders and necessary additional valves were provided.

The *Poling Bros. No. 2* is one of three similar vessels acquired by Chester A. Poling, Inc., last year. Construction was begun on them during the war for the U. S. Navy but had not been completed by V-J Day. The Polings finished them for commercial use, however, equipping them with Enterprise Diesel engines. The *Poling Bros. No. 3* has already been lengthened and it is expected that *No. 1* will also undergo the same operation later this year. Poling now operates 8 motorized oil barges out of New York, up the Hudson River, and other inland waters, and occasionally to Boston and Philadelphia.

The new mid-section is clamped into place, flush with the bow and stern, preparatory to welding and strapping.



Tests of Largest Tanker

Top: Model of proposed 720-ft., 40,000 ton tank ship, tested at a speed equivalent to 18 knots.
Bottom: Model of the 600-ft., 28,000 deadweight ton tankers now being built. The photograph was taken at a speed equivalent to 16 knots, full-size.

Model tests for what will be the largest tanker in the world have been completed at the Experimental Towing Tank at Stevens Institute of Technology.

The tanker will be the fourth largest commercial ship now afloat, surpassed in size by only the *Queen Mary, Queen Elizabeth* and *Europa,* respectively. The hull line has been designed by Vladimir Yourkevitch, designer of the Normandie and many other ships, and will be built by the Shipbuilders Co., Inc., of New York. It will be chartered by American oil interests and used for the ocean transportation of oil.

A six-foot model of the 720-foot tanker was used. Tests were made to find the curve of effective horsepower versus speed so that the designers could determine the most economical speed for the tanker.

Following the basic lines of the *Normandie,* the tanker, when built, will have a beam of 108 feet and the same "lowest resistance" hull form, which will save some 12 per cent in fuel consumption. Tentative plans are for a draft of 30.6 and 33 feet, with corresponding displacement of 47,000 and 51,000 tons.

Although the tanker's speed has not been decided on, it has been studied to be used at 20 knots with an economical speed of 18 knots.

Research Conference Scheduled

The first annual Northern California Research Conference is scheduled for January 12, 1949, it has been announced by W. P. Fuller Brawner, president of the San Francisco Chamber of Commerce.

The conference will be sponsored by the San Francisco Chamber of Commerce, Stanford University and Stanford Research Institute and the University of California.

Principal objective of the conference will be to acquaint Northern California industrialists with scientific research facilities available in the area and to stimulate greater use of these facilities by industry.

T. S. Petersen, president of the Standard Oil Company of California, will serve as chairman of the executive committee. Included among the many Bay Area industrial leaders invited to serve with Petersen on the executive committee for the conference, are the following:

John E. Cushing, president, Matson Navigation Company; Charles A. Dostal, vice president, Westinghouse Electric Corporation; W. F. Humphrey, president, Tide Water Associated Oil Company; A. E. Lacomble, president, Shell Development Company; W. H. Lowe, president, The Paraffine Companies; Alden G. Roach, president, Columbia Steel Company; R. W. Turnbull, commercial vice president, General Electric Company and H. G. Vesper, president, California Research Corporation.

Pacific Marine Review NEWS FLASHES

LUCKENBACH CONVERSION---SEVEN C-3'S

Plans have been completed for the conversion on the Pacific Coast of seven C-3's recently purchased by Luckenbach Steamship Company. Specifications and bidding data have been released to possible bidders on the SEA STAR and SEA FLYER returnable December 29; also on the SEA BASS, SEA CAT and SEA DEVIL returnable January 5. Bids on the SEA BARB and SEA RUNNER will be going out within the next few days returnable during the second week in January at a date to be fixed

Bids go to the Maritime Commission; architect is M. J. Ryan, San Francisco; Luckenbach officers in charge of the betterment program are President James Sinclair at New York and Vincent McMurdo, San Francisco.

* * * * *

MARIPOSA BIDS

Three shipyards bid on the big completion job on Matson's liner MARIPOSA. Low bidder was Todd, San Francisco, by a substantial amount. Other bidders were Bethlehem, San Francisco, and Newport News.

The bids were obtained at this time to serve as a guide to Matson and the Maritime Commission in negotiating a deal for the return of the MONTEREY to the Commission and the completion of the MARIPOSA.

* * * * *

OFFICERS NOMINATED BY SAN FRANCISCO PORT ENGINEERS

Now in process of balloting are the members of the San Francisco Society of Port Engineers for their 1949 officers. The Nominating Committee proposes Bob Streiff of Pacific Tankers, Inc. for president, for vice president, M. C. Wright of Deconhill Shipping, and for secretary-treasurer, George Harlan of San Francisco Port of Embarkation.

* * * * *

CONCERTED CAMPAIGN FOR WEST COAST SHIPBUILDING

Two big meeings were held this month (San Francisco and Seattle) at which demands were made of the Maritime Commission and the Navy for a fair share of the current shipbuilding program for the Pacific Coast. Both meetings were held in AFL labor union headquarters and were attended by Congressmen, city supervisors, shipyard officials, steamship company officers and the press.

THE DOLLAR DECISION

The suit of the Dollar Steamship interests against the Maritime Commission for return of the American President Lines to Dollar control has been decided in favor of the Commission. Stanley Dollar has announced an immediate appeal to higher courts. It is recalled that his previous appeal was successful. If the Commission ultimately prevails the company will be sold.

* * * * *

RESUMING COATSWISE OPERATIONS

The Coastwise Line and the Chamberlin Steamship Company are expected to resume coastwise operations at an early date.

* * * * *

ARMY ENGINEERS' BAY AREA PROJECT

The U. S. Corps of Engineers announces that a favorable report has been made by the district and the division engineers leading to the establishment of a project for the collection and removal of drift from San Francisco Bay and its tributary waters at an estimated first cost to the United States of $850,000.00 for plant and equipment and $203,900.00 annually for operation and maintenance.

* * * * *

86,500 MOTOR BOATS

On the Pacific Coast there are 80,500 motor craft of various pleasure types.

Northern California has 20,000, Southern California, 10,500, Oregon, 15,000, Washington, 35,000. Work boats over 35 feet in length total 6,000.

* * * * *

LAID UP FLEET VESSELS TO BE CONDITIONED

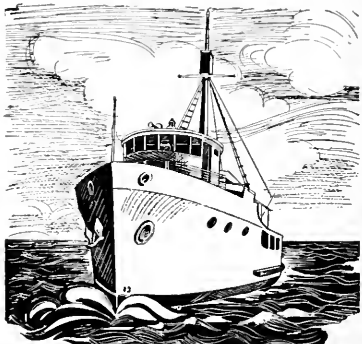
Admiral Smith of the Maritime Commission announces reconditioning of all vessels less than 50 per cent damaged in the lay-up fleets. The Commission will do the work on the East Coast with floating drydocks but on the West Coast private yards will do the work on open bids. It is estimated that of the 352 ships to be reconditioned, about 200 are on the West Coast.

* * * * *

MARITIME COMISSION'S NEW CARGO VESSELS

Following the receipt of bids on the 48,000 ton U. S. Lines' vessel, the Maritime Commission is ready to proceed with the taking of bids on two "prototype" ships. One will be a merchant type vessel and one will be combination merchant and naval auxiliary vessel. Both are to be 20 knots and will be about the size of a C-3. The purpose is to invite operators to order these vessels for their fleets, adapting them to the the particular needs of their routes. Plans and details will be published herein in the near future.

Coast Commercial Craft



The "Carol Virginia"—and a Pre-fab Housing

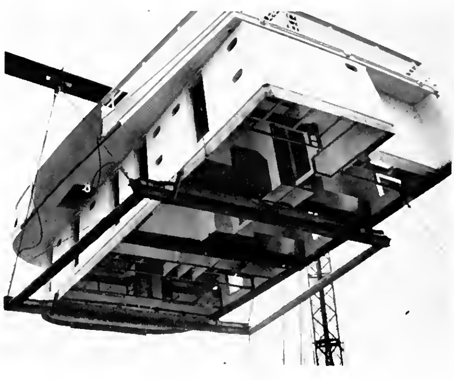
Above: Two mobile cranes at National Iron Works lower 20-ton deck-house and pilot-house sub-assembly into position on the Carol Virginia.

Right: Close-up view of the 20-ton deck-house and pilot-house sub-assembly. Bunks, cabinets and the majority of interior furnishings already are installed in the huge sub-assembly shown here.

Construction of a two-story deck-house, pilot-house sub-assembly saved nearly 600 man hours in the construction of the *Carol Virginia,* 115′ welded-steel tuna clipper now nearing completion at National Iron Works, declared C. Arnholt Smith, president of the local firm.

The sub-assembly, weighing nearly 20 tons, consisted of deck-house living quarters, pilot house, and chart room, and was complete even to the installation of such furnishings as cabinets, bunks, chart tables, etc., including all necessary electric wiring and electric receptacles. As all plumbing installations on National Clippers of the *Carol Virginia* class are confined to the main and raised deck, the only such work required after installation of the sub-assembly, was the placing of toilet and shower fixtures.

Following completion of the huge sub-assembly in a work area near yard's tuna clipper assembly line, the deck-house-pilot-house combination was moved to the line and hoisted into position on the *Carol Virginia's*



deck in less than a half hour.

Heretofore, in the construction of NIW's welded steel tuna clippers, both deck-house and pilot-house have been sub-assembled individually but neither included the final installations made on the *Carol Virginia* assembly.

As Paul Preston, NIW's shipyard superintendent, pointed out, "Installation of wiring and furnishings always have been a costly item in shipbuilding. By making these installations on ground level, rather than on the ship itself, we can realize real savings in tuna clipper construction.

The *Carol Virginia*, the longest welded-steel tuna clipper ever built in San Diego, is scheduled for launching in mid-December. The new vessel will be powered with a 600-HP Atlas Imperial diesel engine, and has accommodations for a 14-man crew.

How Tows Are Planned

Planning tows and piloting tows entail the skills of many men making the river their career. One of the hazards encountered is piloting huge tows through tricky channels.

Above left: Planning a tow. Each of the strips is a scale model of a barge or a steamer.

Above right: Tow tied up shows result of planning, combining barges of varied length and shape.

Opposite: Pushing a tow up inland waterways is a test of skill for the pilot of the towboat "Jack Rathbone." The pilot is in charge while the captain sleeps. They exchange watches every six hours.

Photos courtesy of Standard Oil Co. of N. J.

Running Lights

Dowd of Mare Island Becomes Rear Admiral

Since the picture at the left was received following the Navy Day celebration and Mare Island visit of the Naval Architects, Captain Dowd has been made a Rear Admiral. He is Commandant of the Mare Island Naval Shipyard.

Navy Day Celebration

On the opposite page are pictured groups at the Los Angeles celebration of Navy Day held at the Biltmore Bowl.

1. Seated, left to right: Rear Admiral Ernest M. Pace, Jr.; Fletcher Bowron, mayor of Los Angeles; Walter Braunschweiger, Southern California State President, Navy League of the United States. Standing is Charles S. Thomas, Chairman, Naval Affairs Committee of Los Angeles Chamber of Commerce and Chairman of Navy Day Committee.
   Standing in the rear, in the white coat, is Lawrence Welk, orchestra leader.

2. Richfield Oil Table.
   Around table, clockwise: H. H. Kelly, Purchasing Agent; R. Gross, Treasurer; M. E. Tracy, Assistant to Vice President; T. C. Cook, Manager, Marine Terminal; C. B. Bonner, Secretary; P. C. Lamb, Manager, Marine Department.

3. Head Table.
   Left to right: Charles S. Thomas, Chairman, Naval Affairs Committee of Los Angeles Chamber of Commerce and Chairman, Navy Day Committee; Hon. Artemis Gates, former Under Secretary of the Navy· Rear Admiral Laurence T. Dubose, USN, Commander, Battleships and Cruisers, Pacific Fleet; Hon. Carl Hinshaw, Congressman, 20th District; Major General Louis E. Woods, USMC, Com. Gen. First Marine Air Wing, El Toro; Hon. Leonard J. Roach, member of Board of Supervisors, Los Angeles County; Capt. Leslie E. Gehres, newly appointed Director, Los Angeles Office of Naval Officer Procurement; George Murphy, Metro Goldwyn Mayer Studios; Hon. Wayne Allen, Chief Administrative Officer, Los Angeles County; Colonel Claude E. Duncan, Commanding Officer, Long Beach Air Reserve Training Detachment; Hon. Marshall Stimson, National Trustee of the Theodore Roosevelt Foundation; A. J. Bolton (Capt., USN ret.), Vice Chairman, Naval Affairs Committee, Los Angeles Chamber of Commerce; Commander R. B. Borland, Commander of County Council, The American Legion.

4. General Petroleum Table.
   Around table, clockwise: C. K. Slack, V. A. Bellman; J. J. Dawson; H. Alber; G. L. Adams; C. L. Hansen, Socony Vacuum, New York; Thad Vreeland; C. H. Wartman; C. R. Gates.

5. Byron Jackson Table.
   Around table, clockwise: Floyd Merritt; James Workman; Charles Nazro; E. S. Dulin, president; William N. Beadle; S. W. Burford; Carl Blom; H. G. Koos; Walter H. Wiese; Jack Ballagh.

6. Bendix Aviation Table.
   Around table, clockwise: Chet Wetzel, Walt Thompson Charles E. Mongan, Commander Charles C. Busenkell, Rear Admiral J. R. Armstrong (ret.), W. S. Leitch.

7. Standard Oil Table.

8. Union Oil Table.
   Around table, clockwise: H. D. Seeley, A. E. Grogan, J. S. Swanson, C. E. Rathbone, A. C. Stewart, W. L. Spencer, C. E. Denton, J. W. Miller, K. V. Clifford.

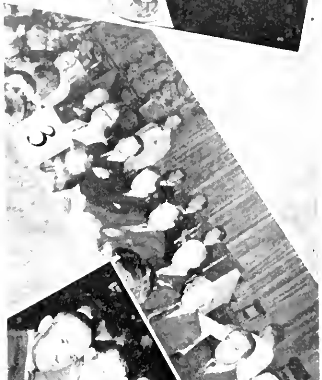
Navy Day at Los Angeles

The Navy has a significance to the maritime industry which it does not have to the public in general, for almost everything the Navy does, in peacetime as well as in wartime, has to do with ships and shipping.

Navy Day, since first introduced in 1922, has been celebrated on the 27th of October each year under the auspices of the Navy League of the United States, often called the civilian arm of the Navy. This date is the anniversary of the birth of President Theodore Roosevelt—so much of whose life was devoted to establishing a sound Naval policy for this nation.

Many civic organizations met with Navy League chapters in ports throughout the country with prominent speakers telling the story of Naval development. Propeller Clubs, Chambers of Commerce, World Trade associations and others joined in the recognition, and Naval installations were thrown open to public inspection. In San Francisco the speaker was Admiral T. C. Kinkaid, Commander of the Eastern Sea Frontier, while in Los Angeles Admiral Dewitt Clinton Ramsey, Commander in Chief of the Pacific Fleet, was the honored guest.

(Captions on page 74)



Capt. Watkins Promoted

Captain Frank T. Watkins, who took charge of the Naval Academy at Del Monte, Cal., "the Annapolis of the West", upon its formation last Spring, has been appointed Rear Admiral.

Shriner Diner

The enthusiastic group above were photographed at the Shrine Lunch Club on American President Lines Day.

Left to right: Ray Buell, Potentate of Islam Temple; John Cuneo, President of Shrine Luncheon Club; Dr. Arthur J. Hook, Potentate of Teheran Temple, Fresno; M. J. Buckley, Potentate of Hibernia Temple.

It should be explained that M. J. Buckley, Senior Vice President of American President Lines, does no more belong to the Shrine than did his predecessor as "Potentate of Hibernia Temple," Hugh Gallagher of Matson Lines. Mike's appointment is one more tribute to his great popularity in nearly half a century in shipping.

World's Largest Naval Supply Base

An aerial view of the Oakland Naval Supply Center looking east. Bay Area residents on Navy Day witnessed displays, exhibits and demonstrations in the Naval Supply Center as well as at Mare Island, San Francisco Naval Shipyard, Moffett Field, Naval Air Station and Treasure Island. In each of these there are six to eight thousand employees.

New Nordberg Bulletin

The publication of Bulletin 161 covering Nordberg Diesel Engines of the FS-9 and FS-13 series is announced by Nordberg Manufacturing Company, Milwaukee. This new bulletin gives design and operating features of Nordberg four-cycle Diesel engines in 9″ and 13″ cylinder sizes providing a power range from 150 to 1370 H.P. for a wide variety of services ranging from self-contained portable power units to permanent installations and auxiliary units for cargo and passenger ships and tankers. Specifications and dimensions of FS-9 and FS-13 engines are also given in this 12-page bulletin.

Copies of Nordberg Bulletin No. 161 may be had upon request.

Wire Rope Catalog

The Wickwire rope mill, Palmer, Mass., who have reached their fiftieth anniversary of wire rope making, recently issued a catalog describing their operations.

The catalog has three indexes that permit quick reference to the contents. The first section covers the characteristics of wire rope; the

second section, divided into six parts, describes wire rope for specific industries; and the third section deals with the care and handling of wire rope. Charts, tables, drawings and photographs have been included.

Westinghouse Announces Formation of Atomic Power Division

Gwilym A. Price, President of the Westinghouse Electric Corporation, has announced the formation of an Atomic Power Division which will concentrate solely on the harnessing of nuclear energy for the production of useful power.

The new Division will be avail-

Charles H. Weaver

able to undertake atomic energy projects for the government as well as to carry on independent studies, and it will conduct research, development, engineering, and associated construction. It will work closely with the Westinghouse Research Laboratories and with other divisions of the company so as to benefit from their knowledge, experience, and facilities.

Manager of the Atomic Power Division will be Charles H. Weaver, a young Westinghouse executive who has recently served as industrial manager of the company's central district with headquarters in Pittsburgh.

Weaver was graduated from the University of Pennsylvania in 1936 and joined Westinghouse that same year. During the war years he served as manager of the Westinghouse Marine Department which, from 1945 on, included aviation activities also.

Armistice Day at San Francisco Ad Club

Left to right: Rear Admiral John R. Redman, USN, Deputy Comdr. Western Sea Frontier and Pacific Reserve Fleet; Rear Admiral W. K. Scammell, USCG, Comdr. 12th District, Western Area United States Coast Guard; Major General George F. Moore, USA Deputy to Commander, Armed Forces Headquarters, Utilization Facilities and Services; Vice Admiral George D. Murray, USN, Commander, Western Sea Frontier, Pacific Reserve Fleet, Commandant, 12th Naval District; Robert R. Gros, Pacific Gas & Electric Company, President of the Advertising Club; Major General J. E. Upston, USAF, Comdr., 4th Air Force; Major General Leroy P. Hunt, USMC, Commanding General, Department of the Pacific; Capt. J. J. Mahoney, USN, Chief of Staff, 12th Naval District; Capt. T. R. Wirth, USN, Public Information Officer, Western Sea Frontier and 12th Naval District; Lt. Comdr. R. L. Johns, USN, Aide to Admiral Murray. Admiral Murray was the principal speaker.

Stanford to Investigate Subsidence at Los Angeles-Long Beach Harbor

The Los Angeles Board of Harbor Commissioners has authorized the Stanford Research Institute to investigate the cause of subsidence on Terminal Island near the Los Angeles-Long Beach city boundaries. The Institute has been retained by the Long Beach-Los Angeles Harbor Subsidence Committee to survey and make recommendations on land sinking in the harbor area.

Society of Naval Architects and Marine Engineers

Pacific Northwest Section

The group below met in Seattle last month to plan future programs for their meetings. They are, left to right: Paul E. Forsythe, Western Gear Works; H. E. Lovejoy, Puget Sound Freight Lines; Thomas M. Rowlands, University of Washington; James F. Petrich, Western Boat Building; Gordon Snyder, W. C. Nickum & Sons; Captain L. A. Kniskern, USN, Puget Sound Shipyard; W. H. Watkins, Puget Sound Shipyard; Frank E. Blumberg, W. C. Nickum & Sons.

At the December 3 meeting a paper was presented by Captain Logan McKee, Planning Officer, Puget Sound Navy Yard. The subject was "The Use by the Germans of Hydrogen Peroxide for Production of Power in World War II." This paper will be published in an early issue.

San Francisco Propeller Club Nominates

The nominating committee of the San Francisco Propeller Club proposes the following for next year's officers: President, Edward H. Harms, Pope & Talbot; First Vice President, K. C. Tripp, Moore-McCormack; Second Vice President, R. A. McLaren, Pacific Transport Lines; Third Vice President, George Killion, American President Lines; Secretary-Treasurer, Eugene A. Hoffman, American President Lines; Assistant Secretary-Treasurer, Carl E. McDowell, Pope & Talbot, Associate Professor of Foreign Trade, Stanford University.

For 3 year Governors: E. H. Harms; K. C. Tripp; George Killion; H. Gelhaus, Tod Shipyards; Marshall Levis, Marsh & McLennan. The following are holdover governors: J. J. Geary, Admiralty Attorney; D. N. Lillevand, Grace Line; V. P. McMurdo, Luckenbach; H. B. Perrin, Matson Navigation; General Robert Wylie, State Board of Harbor Commissioners; R. A. McLaren; H. W. Parsons, Cargocaire, Inc.; F. C. Ninnis, Jr., Ocean Agencies; John Parker, American Marine Paint Company; George V. Cooley, American-Hawaiian Steamship Co. General Wylie is not a holdover but fills a vacancy.

Edward H. Harms

Weeks Joins Pacific Division of Atlantic Mutual and Centennial Insurance Companies

Gilbert N. Weeks well-known insurance underwriter, joined the Pacific Division of the Atlantic Mutual and Centennial Insurance companies on October 1, according to an announcement by Miles F. York, vice president in charge of Western operations for the companies. Mr. Weeks has been engaged in the marine insurance business in San Francisco since his graduation from the University of California in 1929.

Gilbert N. Weeks

Mr. Weeks will spend several months in the San Francisco and Los Angeles offices of the companies, following which he will be transferred to Seattle to establish and manage the Pacific Northwest headquarters of the Atlantic and Centennial.

New Manager of Independent Tankships

Capt. T. C. Conwell, widely known East Coast tankship operator, who has just been appointed manager of Independent Tankships, Inc., wholly owned subsidiary of the American Independent Oil Co., of San Francisco. He will maintain offices in New York.

Long Sperry Service

William I. Selover, Southwestern district manager of the Sperry Gyroscope Company, recently observed his 35th year with the company. Before 1920 he worked closely with Lawrence Sperry while the latter was pioneering blind flying instruments and bombsights. He also helped install the first commercial gyro-compass in 1919. He has been in charge of the Southwestern district since the office was established in Los Angeles in 1923.

Ocean Agencies Agent For Shepard Steamship

Ocean Agencies, Ltd. has been appointed Pacific Coast Agent for the Shepard Steamship Company, who recently closed their San Francisco offices.

Joining Ocean Agencies as president is Mr. F. C. Ninnis, Jr., formerly District Manager for the Shepard Steamship Company. Ninnis is a Governor of the Propeller Club.

F. C. Ninnis, Jr.

Long Beach Installs Harbor Radar

A STORY of the world's first installation of harbor radar— in Liverpool—appeared in the October issue of the *Pacific Marine Review*. Now the port of Long Beach, Cal., is installing harbor rador, believed to be the first installation in the United States.

A 120-foot steel tower is being erected at the foot of Pier A, Long Beach, and the radar control equipment is being installed for use in guiding ships to berth and to provide a safe medium for the movement of shipping during periods of heavy fog and resultant low or zero visibility. The radar equipment is being furnished by the Sperry Gyroscope Company, Inc., with installation being made by the Kuster-Wetzel Electric Company of Long Beach.

The radar scanner is to be mounted atop the 120-foot steel tower with the indicator scope to be located in the pilot station. With such radar control, it will be possible to observe and locate all ships within a distance of 10 to 30 miles from the port and direct the pilotage of ships in and out of the harbor. The port pilot will be in direct contact with the pilot station at all times through the medium of transmitter-receiver sets in the pilot station and pilot boats and through the use of walkie-talkie radio sets. The procedure to be followed corresponds closely with the Ground Control Approach system for aircraft where the pilot of the approaching plane is "talked down" to within 50-feet of the center of the runway. In like manner, incoming or outgoing ships will be "talked" through the breakwater entrances and down the harbor fairways.

It is anticipated that the equipment will be completely installed and in operation by January 1, 1949, and for the first time ships will be able to enter or leave the port even during those periods of foggy weather where otherwise they would be unable to navigate.

Shore Based Radar

IN A TALK before the American Merchant Marine Conference at New York City on October 14, 1948, Capt. D. E. McKay, Chief, Communications Division, USCG, discussed operational aspects pertinent to the use of shore-based radar for harbor control, citing as a comparative example the popularity enjoyed by the so-called GCA (ground control approach) system in use at certain airports to "talk down" aircraft during periods of adverse weather.

In support of shore-based radar for harbor control, Captain McKay made reference to documents submitted at the first IMRAN held in London (England) in 1946 which emphasized the desirability of supplementing harbor facilities with radar thus providing, "* * * virtually instantaneous information of movements in the port area."

Numerous interesting facts were presented concerning operational considerations leading to the design and installation of the Liverpool (England) radar station, namely:

Shore based radar would clearly indicate shipping conditions in the channel and river.

During a fog the master of a ship could take his vessel up the narrow channel to Liverpool and permit the vessel to berth rather than anchor off the entrance and perhaps miss several tides.

Shore-based radar would likewise enable a master to undock and proceed to sea knowing that the channel was clear of shipping.

In event of the channel becoming blocked, the harbor authorities would be aware of the fact and shipping about to enter could be warned.

Radar would reveal and locate stranded vessels within the port and possibly result in the saving of a vessel which might otherwise be lost.

Positions of navigational sea marks within port area and approaches could be checked. If out of position, port authorities could warn shipping and replace marks.

Port Health Officers, Customs and Immigration officials could be better informed as to the movements of all incoming vessels, resulting in time saving.

Captain McKay pointed out that these operational considerations and advantages, foreseen as a result of the Liverpool installation, placed into operation July 30, 1948 are more or less applicable to ports and harbors generally.

He further pointed out that in the United States use of radar for harbor control is and has been under consideration: That some experimental installations had been set up by the Coast Guard and limited tests conducted from which certain conclusions were reached, namely, that control of shipping at harbor entrances and in channels is feasible by means of shore radar installation supplemented by an efficient communications system.

He pointed out that coordinating supervision of such service, with respect to uniformity of procedures and methods of operation of the installation of several ports would fall within the province of the Coast Guard. This perhaps could be accomplished by indirect approach through organizations such as the American Association of Port Authorities or by direct liaison with the operating agency in an advisory capacity. Supervision by the Coast Guard would insure coordination of such service with military requirements, making it adaptable for immediate use in event of a national emergency.

"Confound you, yoeman," roared the Admiral, "why don't you be more careful?

"What do you mean sir?"

"Why, instead of addressing this letter to the Intelligence Offices you addressed it to the Intelligent Officer. You ought to know there's no such thing in the Navy."

Model Tests on Tanker Hulls

(Continued from page 56)

ation is permissible in the choice of hull coefficients.

7. The primary factors which affect shaft horsepower are the resistance of the hull and appendages, the propeller diameter, and the propeller revolutions per minute.

8. Propeller diameter is the most important factor influencing the wake fraction.

9. If the practical considerations involved in the selection of propelling machinery are excluded, the slowest turning propeller having the largest diameter is to be preferred.

Propulsion data for vessels at a Speed of 16 knots

Ship	EHP	SHP	RPM	t	w	1-t / 1-w
A	7260	8840	80.6	0.216	0.338	1.185
B	7660	10150	88.9	0.210	0.355	1.225
C	7140	9850	119.0	0.230	0.420	1.328
D	7180	9730	91.7	0.195	0.340	1.220
E	7360	9580	81.6	0.224	0.350	1.194
F	7080	8640	79.0	0.200	0.360	1.250
G	7185	9450	80.4	0.229	0.370	1.222
H	7260	9040	90.2	0.202	0.360	1.247
I	7500	10690	110.9	0.250	0.410	1.271
J	7200	9790	109.1	0.204	0.400	1.327

Ship	Err	EHP / SHP	Prop. Diam.	EHP / EHP min.	SHP / SHP min.
A	1.103	0.821	22.87	1.025	1.023
B	1.037	0.750	22.41	1.082	1.175
C	1.057	0.724	18.56	1.008	1.140
D	1.018	0.738	21.71	1.014	1.126
E	1.041	0.769	22.00	1.040	1.109
F	1.048	0.819	22.00	1.000	1.000
G	1.014	0.760	22.00	1.015	1.094
H	1.067	0.804	21.85	1.026	1.046
I	1.027	0.702	19.58	1.059	1.237
J	1.009	0.736	19.59	1.017	1.133

Selection of Steam Conditions For Merchant Vessels

By MARK L. IRELAND, JR.
of the Newport News Shipbuilding and Dry Dock Company, and DOUGLAS C. MACMILLAN, Associated with George G. Sharp, Naval Architect

How far a commercial ship operator should go in increasing steam conditions aboardship is primarily an economic question with higher first cost and carrying charges to be weighed against the expected reduction in fuel cost. The solution of the problem for any particular ship requires a determination of the fuel consumption and the initial cost of steam plants of the desired power but designed for various steam conditions. Studies have previously been made of comparative steam cycles and considerable information published showing the thermal efficiency that may be expected with various steam conditions, but comparatively little information has been presented previously concerning the initial cost.

The authors present data on the fuel performance and initial cost of marine steam plants in sizes ranging from 6,000 to 20,000 shaft horsepower per shaft, and with

(Please turn to page 90)

KEEP POSTED

New Equipment and Literature for Yard, Ship and Dock

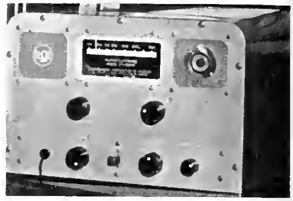
New RCA Small Craft Radiotelephone

Featured in the 1949 line of RCA marine equipment are an outstanding new combination entertainment broadcast receiver and two-way marine radiotelephone, shown for the first time by the Radiomarine Corporation of America at the New York Motor Boat Show.

Designed especially for use aboard small craft where space is at a premium, the new popular-priced compact radiotelephone, model ET-8044, combines in a single weather-resistant hammered grey aluminum cabinet a four-channel, crystal controlled radiotelephone for ship-to-shore, ship-to-ship and ship-to-Coast Guard communication in the 2100 to 2800 kilocycle band, and a high grade superheterodyne entertainment receiver for the standard 540 to 1600 kilocycle broadcast band.

Equipped with a built-in loudspeaker and a small, light, hand-held microphone, it operates from a boat's 6 or 12 volt D. C. power supply and is completely housed in a small cabinet measuring nine inches high, nine inches deep, thirteen and one-quarter inches wide, and weighing only twenty pounds.

Outstanding features claimed for this new radiotelephone by its manufacturer include small power consumption, magic eye tuning tube



RCA Radiotelephone

and separate antenna control for maximum transmitter efficiency, circuit design that will not permit overmodulation, integral power unit, filtered power supply permanently pretuned circuits, miniature tubes, smaller crystals and table or bulkhead mounting.

South Bend Drill Press Catalog

The South Bend Lathe Works, South Bend, Indiana, has issued a new catalog, No. 400, devoted exclusively to the new South Bend 14" precision drill presses and drill

press attachments and accessories. Both bench and floor models of the drill presses are shown in the catalog.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

.................................issue. Page No.............

....

....

....

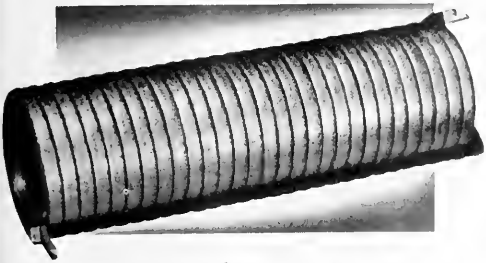
(Identify by name of manufacturer and catalog)

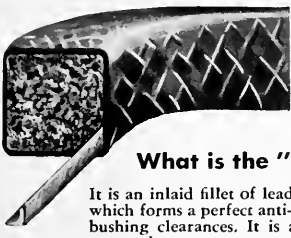
NAME..

BUSINESS..

ADDRESS...

....



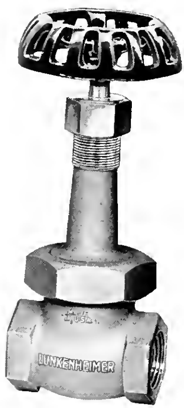


Lunkenheimer Announces New "Union Bonnet" Gate Valve

Incorporating the first application of full cylindrical body sections to bronze gate valves, the new Lunkenheimer Fig. 2228 provides maximum distortion resistance. Tests, setting up pipe line stresses and internal pressures far in excess of actual service conditions, have shown no distortion in body or valve seats.

Fig. 2228 is a 200 lb. S. P. bronze, double disc, "Union Bonnet" Gate Valve with rising stem and screwed ends. A companion valve, Fig 2229, is the flange end pattern, rated at 150 lbs. S. P. They are made in sizes ¼" to 3".

Among the features listed by the manufacturer are: A patented silicon alloy stem material which eliminates stem-thread failures; hexagon head gland; beveled disc wing guides and body guide channels to make assembly easy when servicing the valve.



New Lunkenheimer Gate Valve

Illustrated Circular No. 534 is available on request; it shows principal features, dimensions and other data. Address: The Lunkenheimer Company, Cincinnati 14, Ohio.

Marine Service Distributor For T-A-C Ratchet Wrench

C. J. Hendry & Company, San Francisco, have appointed Marine Service, Inc., Seattle, as Northwest distributor for the T-A-C ratchet wrench.

The new open-end ratchet wrench is designed for use on pipe, tube, conduit, cable, and rod fittings where an ordinary ratchet cannot be used. The ratchet heads operate in a 7½° arc or less, making it easy to operate in restricted areas.

Babcock & Wilcox Produces Film on Steam Boilers

The Babcock & Wilcox Company announces the release of a new 16 millimeter educational film, "Steam for Power," which depicts the development and application of modern steam boilers. The Company stated that this sound film, which is in color, will be of interest to civic groups, professional societies, engineering students and those interested in the production and use of power.

Making extensive use of both animation and photography, "Steam for Power" traces the important steps in the history of man's efforts to obtain ever more abundant and economical power by using steam to harness the energy released by the combustion of fuels.

Each step in the development of modern boilers and the reason for it is shown and the meaning of high steam pressures and temperatures is illustrated. The application and function of superheaters, economizers, air heaters, reheaters and the cyclone steam separator are explained as well as the development of water-cooled furnaces, pulverized coal firing, slag-tap units, dry ash removal and the cyclone furnace.

Significant steps in the manufacture of boiler components are shown. These include the bending of huge steel plates to make boiler drums, welding of drum seams, 2,000,000 volt X-raying, steel making and fabrication of seamless and welded tubing.

The concluding sequences of the film show the erection of a large radiant boiler in one of the country's outstanding power stations.

"Steam for Power" has a running time of 41 minutes and is available free of charge to engineering and other professional societies, engineering schools, civic organizations and groups interested in power generation and utilization. Written requests should be made to the Advertising Division, The Babcock & Wilcox Company, 85 Liberty Street, New York 6, N. Y.

FOR SALE

CARGO VESSELS

AND

MARINE EQUIPMENT

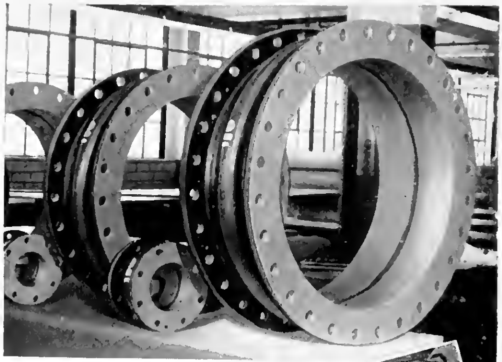
VESSELS — 1 cargo turbine, displ. 10,600 (f. l.), 482'x60'x20', 6700 SHP, AE type. 5 LST's. 5 LSM's. 5 LCI's.

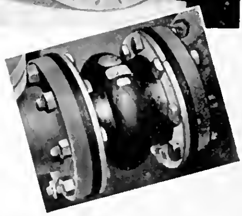
- **LIBERTY SHIP ENGINE PARTS**
- **CARGO WINCHES**
  Lidgerwood and Markey
- **PUMPS, STEAM**
  From 4½ x 3¾ x 4 to 18 x 14 x 24, including air pumps.
- **PUMPS, ELECTRIC**
  From ¾ HP to 30 HP.
  115 DC, 230 DC, & 440 AC.
- **PUMPS, DIESEL**
  1000 GPM at 260' head. New and used.
- **GENERATORS, STEAM**
  25 KW, 60 KW 75 KW, 190 KW, 240 KW; Steam 150# to 575#; Current, DC & AC.
- **GENERATORS, DIESEL**
  20 KW DC, 30 KW DC, 100 KW AC or DC, 200 KW AC or DC, 1000 KW AC.
- **ENGINES, DIESEL**
  225, 450, 900, 1600, & 1800 HP, running or guaranteed.
- **TRANSFORMERS**
  100 KVA to 500 KVA, 2300V primary.
- **2500 KVA SUBSTATION COMPLETE**
  34,500V—primary; 2,300V—secondary.
- **MISCELLANEOUS EQUIPMENT**
  From vessels of various types.

Southern CALIFORNIA'S Largest SHIP DISMANTLERS

NATIONAL METAL & STEEL CORP.

DEPT. F. TERMINAL ISLAND, CALIF.
LOS ANGELES: NEvada 6-2571
Cable: NACOR





Garlock

RUBBER EXPANSION JOINTS

for Pressure, Vacuum or Pressure and Vacuum

Garlock Rubber Expansion Joints are flexible, rubber spool-type joints for installation in pipe lines to relieve stresses and strains in the piping and equipment. They function in four ways: (1) compensate for linear expansion and contraction due to temperature changes; (2) absorb vibration; (3) eliminate or reduce noise; (4) compensate for minor misalignment in the piping.

Made of an exclusive high-grade rubber compound developed in our research laboratories, Garlock Rubber Expansion Joints are strong, efficient and long-lasting. They are easy to install. Furnished in all pipe sizes from 2" to 72"—and in three styles: No. 204 for *Pressure*; No. 205 for *Vacuum*; No. 206 for *Pressure and Vacuum*.

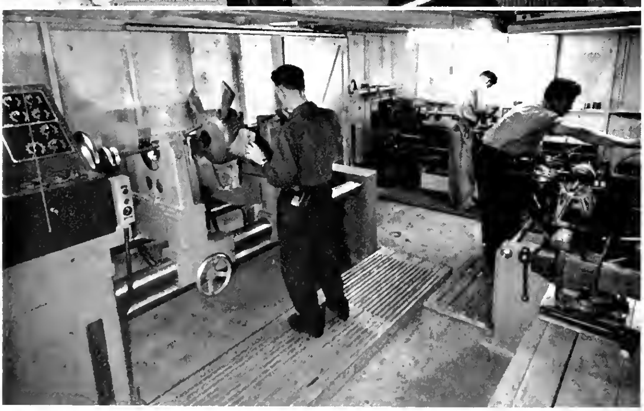
Garlock Rubber Expansion Joints of standard construction are suitable for handling hot or cold water, brine or exhaust steam at temperatures up to 180°F. Joints with synthetic rubber lining are recommended for service involving oils, acids or mild caustic solutions. Write for new descriptive folder.

THE GARLOCK PACKING COMPANY
PALMYRA, N. Y.
San Francisco Los Angeles
Seattle Portland

GARLOCK

New Balancing Service for Bay Area

Witnessing demonstration of Dahl-Beck's new balancing equipment, left to right: Gene Morgan, Ed Beck, Earl Headlee, Stan Perry, Bob Lewis and Bill Beck.



Special dust-proof room built by Dahl-Beck for balancing rotating parts. Equipment includes two Gisholt Dymetric Balancers and tray-top "cintilathe" made by Cincinnati Lathe & Tool Company. (Balancers detect unbalance to 1/25 millionth of an inch.)

New machines that measure unbalance in a rotating shaft down to 25 millionths of an inch have been installed and are now operating under full capacity in a special shop at Dahl-Beck Electric Company of San Francisco. It has become standard procedure to balance every rotating part brought into their plant for repair or rebuilding. President William Beck says that "with the new $30,000 department, we can undertake to guarantee old

reconditioned parts to outwear new ones that have not had this treatment. The most precise manufacturing methods can still leave rotating parts out of balance, and it is amazing to discover the terrific force that goes to work when these parts are rotated at high speed. For example, a shaft with a mere one ounce of unbalance, one inch from its center, sets up a force against its bearings of 44 pounds when spun at 5000 rpm. Revolve this up to ten times as fast and you get 100 times this force, or 4400 pounds! The job of our new department is to detect and eliminate this destructive force."

The new shop, temperature controlled and dust-protected, has at its heart two Gisholt Dymetric Balancing Machines, which can accommodate parts from 10 pounds to 3000, and up to 48 inches in diameter, 52 inches between bearings.

This brings Dahl-Beck's repair facilities up to a new Pacific Coast standard of excellence. Other modern installations include: Two washing and degreasing systems, two vacuum impregnating units and an electric bake oven capable of holding any size ship generator, motor, or armature. Every motor is put under full load test on the Dynamometer at Dahl-Beck, which eliminates all guess work as to HP output, sparking at brushes, reversals in field, and other common defects in electric plants, industrial or shipboard.

The addition of the new Gisholt precision equipment now enables Dahl-Beck to balance any and all types of machinery, marine or industrial, including turbine rotors, crankshafts, fans and pump impellers.

Banning President of L. A. S.S. Assn.

J. B. Banning, Jr., of the Matson Navigation Co., has been elected president of the Los Angeles Steamship Association.

Also elected were W. B. Bryant, District Manager, General Steamship Corp., Los Angeles, Vice President; Harry R. Dorr, Resident Manager, Norton, Lilly & Co., renamed Secretary-Treasurer, and Miss Margaret Bridges, Assistant Secretary.

Elected directors were:

Charles Baly, President, Crescent Wharf & Warehouse Co.; S. J. Hindle, General Agent, American President Lines; M. G. Linder, President, Transmarine Navigation Corp.; L. C. Munson, Vice President, Williams, Dimond & Co.; L. R. Richards, Manager, Sudden & Christenson, Inc.; W. C. Ricks, District Manager, States Steamship Co.; Charles L. Tilley, General Manager, Outer Harbor Dock & Wharf Co.; W. A. St. Amant, Manager, W. R. Grace & Co., Los Angeles.

Alternate Directors elected for the ensuing year:

R. J. Chandler, Vice President, Matson Navigation Co.; O. W. Pearson, Vice President, Marine Terminals Corp., (L. A.); H. H. Birkholm, President, American Pacific Steamship Co.; J. W. Zundel, Manager, Funch, Edye & Co.; Edgar M. Wilson, Vice President, American President Lines; Roland Stevens, Vice President, Transmarine Navigation Corp.; Guy B. Reynolds, Traffic Manager, Williams, Dimond & Co.; S. T. Lashbrook, Assistant Manager, Sudden & Christenson, Inc.; P. T. Douglas, Traffic Manager, State Steamship Co.; D. Cutler, Assistant Manager, W. R. Grace & Co.; J. A. Barry, Traffic Manager, Outer Harbor Dock & Wharf Co.

Insulation in "Lurline"

(Continued from page 58)

weathering and salt water damage was finished with asbestos cloth and an asphaltic-asbestos plastic material. Insulated lines situated near stairways, gratings or other points where the insulation might be damaged were enclosed in sheet metal jackets long enough to protect the entire length of the section of insulation subject to damage.

Wherever pipe insulation abutts flanges and fittings and near hangers, the ends of the insulation were tapered off to permit free removal of bolts and to allow for the movement of pipe at the hangers. To permit insulated lines passing through bulkheads to expand without damage to the insulation, expansion joints were located at regular intervals in the lines.

Valves, flanges and fittings on lines finished with cotton lagging tape were insulated with permanent type insulation. The standard molded forms of insulation were used, i.e., block, segmental, or sectional, depending upon which was most convenient. These forms were cut to fit the valve or flange to be covered, and applied in the same manner as the insulation on the adjacent lines. In addition, a layer of asbestos cement was applied over the insulation. The finish used was the same as that on the adjacent piping.

Flanges, fittings and valves on all other lines were insulated with removable and replaceable insulation, finished with asbestos jacketing. This was done so that the flanges and fittings can be reached quickly if it should be necessary to check them for gasket wear, leakage, etc.

Turbine insulation is a combination of both permanent and removable insulation. Main turbine joints and valves that need to be opened for maintenance and inspection were insulated with removable and replaceable insulation. Main turbine bodies were blocked in with permanent insulation, the blocks being kept in place by means of iron wire tied to steel bars tack-welded to the surface of the turbine after which the entire turbine was enclosed in stainless steel.

Like the pipe insulation, the equipment was finished with an asbestos jacket. Also the rosin base emulsion cement was applied over the asbestos jacket, and then painted. In some cases, as on the soot blowers beside the boilers, a metal jacket was used instead of the asbestos.

Selection of Steam Conditions For Merchant Vessels

(Continued from page 83)

steam conditions ranging from the present standard of 450 psig 750 F to a high of 1250 psig 950F. They also discuss the economics of selection of components and auxiliaries including turbo generator sets, feed pumps, number of stages of feed heating and condensers.

The results of the fuel and initial cost studies are presented in such a manner that selection may be made on the basis of capital charges and fuel cost applying in any particular service. Based upon usual values, the results presented indicate the following general conclusions:

Steam conditions of 450 psig 750 F would be selected normally for installations of about 6000 shaft horsepower. There is some improvement for 450 psig 850 F, but the incentive is not great even when considering the probability of higher fuel prices.

Steam conditions of 615 psig 850 F would be selected

normally for higher powers for both cargo and combination ships. If higher fuel prices or lower fixed charges are anticipated, then 900 F at the same pressure shows a slight improvement, which, however, hardly appears to be worth the risk. In any case there seems to be little incentive to further increase in steam pressure. In this connection it is pointed out that steam conditions exceeding 600 psig 825 F are offered for standard stationary power plants only for unit ratings of 20,000 kilowatts or greater.

For a tanker of 12,500 shaft horsepower, the use of higher fuel prices will show appreciable savings for various steam conditions higher than 615 psig 850 F. In each case the expected savings should be weighed against the probable risk. There appears to be more incentive to increase the temperature than to raise the pressure, but the risk may also be greater.

Marine Salvage

By REAR ADMIRAL
WILLIAM A. SULLIVAN

Marine salvage, or the saving of ships which are in a perilous condition, is a hazardous undertaking. There are several recognized branches—the work of towing in disabled vessels is called rescue tug work; the salvage of vessels stranded or sunk in exposed locations is called offshore salvage; the salvage of vessels sunk in sheltered waters is called harbor salvage; cargo salvage involves the salvage of cargo from ships too badly wrecked to be salvaged as a whole.

Offshore salvage involves work of a most difficult character—time is a most important factor for ships sunk or stranded in exposed positions are at the mercy of the elements. Successful offshore salvage requires ships which are especially constructed and fitted out with gear for the purpose and which are manned by especially trained and experienced personnel.

Most offshore salvage is done to refloat stranded ships. The salvage of a stranding can be influenced by many factors—perhaps the most important is the amount of buoyancy which the ship lost in stranding. The amount of this lost buoyancy is equal to the weight of the ship which bears on the beach. If it can be eliminated, the ship will float free. Sometimes the rising tide or the removal of cargo, stores, etc. will so reduce the amount of the weight resting on the beach that this will happen. If it does, positive action should be taken to remove the ship for it may be then in danger of broaching. Ships broadside on the beach are in a most perilous condition for they are not only in danger of breaking up, but they will also be much more difficult to take off.

Tugs are sometimes used to pull on stranded vessels. The pull which can be developed by a tug is relatively small and, unless a ship is nearly afloat, there is little chance of a tug freeing it.

The drag needed to pull a stranded vessel from the beach is that which is needed to overcome the friction developed under the bottom of the stranding. The amount of this friction is a function of the weight of the ship resting on the bottom. It varies with the character of the material in the ground under the ship. Any reduction in the amount of lost buoyancy caused by the removal of weight or by a rising tide will reduce the

(Please turn to page 92)

Marine Salvage

(Continued from page 91)

force needed to drag the ship off.

The most positive and effective method for dragging off stranded ships is the use of beach gear. Beach gear consists of heavy anchors planted offshore and connected to the stranding with wire rope hawsers. On deck, these hawsers are connected to purchase gear which are worked by the ship's winches. Several sets of purchase gear may be used on one stranding.

The use of beach gear is often combined with the work of lightening the ship by removing cargo, stores, fuel or other weights. It is often combined with other methods to salvage stranded ships. When ships are aground on sands or gravels susceptible to scouring, the services of a twin-screw tug may be used to scour out the sands under the ship so as to permit it to sink to a deeper draft.

When ships are stranded on rock or coral, the use of jacks is sometimes combined with that of beach gear for freeing these vesels. Jacks are placed on the top of spuds which are ranged along the side of the vessel and pressure is exerted on the jacks on the under side of the sheer strake. This transfers some of the weight of the ship from the ground under it to the spuds and it lessens the force of friction resisting the pull of the beach gear.

Most sunken ships are raised by the use of pumps which are reliable, and which are less apt to develop difficulty than is the use of compressed air. Before sunken ships can be pumped, any holes through which water can enter must be patched and the patches must be installed by divers. The attachments used by divers to fasten underwater patches are generally unsuited for holding the patches against pressure. Underwater patches, therefore, must be applied on the outside of the ship's structure so that they will bear with the pressures obtained when pumping is undertaken. When divers cannot get access to the outside of a sunken ship in the way of a hole which needs patching, difficulty is encountered and the use of compressed air as a possibility for raising the ship is considered. Tankers, combat vessels and particularly submarines are, by their construction, particularly suited to the use of compressed air and, when such vessels are sunk, they are frequently raised by the use of compressed air.

Controllable Pitch Propellers

By COMMANDER LEWIS A. RUPP, USN

Controllable-pitch propellers for ships were first considered seriously in the middle nineteenth century in order to permit feathering the propeller blades when operating with sails only and to provide flexibility when using both sails and steam engines for ship propulsion.

A semi-controllable-pitch propeller was installed in the *Merrimac* (renamed the *Virginia*) in her historic encounter with the *Monitor* in 1862.

Most early controllable-pitch mechanisms lacked sufficient ruggedness to withstand the large control forces imposed on them, with the result that failures were frequent. Kaplan turbine-type hydraulic mechanisms developed in Switzerland in 1934 and in Sweden in 1937 proved that controllable-pitch propellers could be made reliable in diverse marine applications. For multi-purpose Diesel tugs, fishing craft, and other types which operate

with widely varying towing loads, controllable-pitch propellers permitted utilization of full engine power during all conditions of operation, provided superior maneuvering at slow speeds around docks and when handling trawls and nets, provided greater deceleration in emergency stopping maneuvers, and oftentimes permitted improved fuel economy under cruising conditions. These advantages for towing craft, coupled with the advent of the marine gas turbine, prompted the marine industry in all countries to take renewed interest in controllable-pitch propellers in recent years.

The problem of reversing with a gas turbine installation is not easily solved by conventional means. Astern turbines, such as are commonly used in steam installations, are nearly impossible in gas turbine applications because of excessive windage losses and dangers from overheating. Reverse gears above 3000 horsepower have not yet been developed and hydraulic reversing couplings, though a possibility, sacrifice efficiency through transmission losses. Available reversing means for larger installations include only electric drive and the controllable-pitch propeller. The former requires greater first cost, weight, space, and transmission losses. The latter has the disadvantages of a possible slight loss in propeller efficiency due to its larger hub size and a more vulnerable location of vital mechanisms, though it has the additional advantage of greater combined turbine and propulsion efficiency at part load by virtue of reducing the propeller pitch and thereby increasing the prime mover speed to a more efficient range.

To evaluate the potentialities of controllable-pitch propeller applications in present day, as well as future prime movers, the U. S. Navy fitted experimental installations in a small Diesel harbor tug in 1940, a 28,000-horsepower, twin-screw, turbine-powered World War I destroyer, U. S. S. *Dahlgren,* in 1941, and in a 1000-horsepower Diesel harbor tug, YTB502, in 1946. In addition, over 2400 controllable-pitch propellers, each powered by light weight, non-reversible Diesel engines and absorbing 900 shaft horsepower, were installed in approximately 100 patrol craft and 1100 infantry landing craft which saw action in all theatres of operation during World War II.

Complete trials of YTB502 were conducted in 1946 to determine the centrifugal, frictional, and hydrodynamical blade spindle control forces and to evaluate the free route towing, dead pull, and emergency maneuvering performance as compared to a sister tug with reversing Diesel engines and a fixed-pitch propeller. The controllable-pitch propeller installation had equivalent performance in free route, permitted an increase of over one-third in the towrope pull at dead pull, and stopped in 25 per cent less time and distance in an emergency stopping maneuver. Analyses of various Diesel installations also indicate that fuel savings of 5 to 10 per cent can be effected at cruising power by increasing the pitch and thereby increasing the engine mean effective pressure.

The *Dahlgren* trials in 1941 indicated that considerable losses can result from large propeller hubs with improper fairing forward and aft of the propeller, but other tests and installations indicate that losses from properly faired controllable-pitch propeller hubs need never exceed 1 to 2 per cent. The *Dahlgren* trials showed that turbine-driven vessels with controllable-pitch propellers can be stopped in less than two-thirds of the

(Please turn to page 96)

Light Weight Salvage Pontoons

The rubberized fabrics divisions of the Goodyear Tire and Rubber Company, Akron, Ohio, has announced development and production of new light-weight salvage pontoons for the United States Navy.

Goodyear designed and built three sizes of syringe-bulb fabric air containers capable of lifting 15, 25, and 40 tons respectively.

One of the biggest problems to overcome in the building of these huge mushroom-shaped bubbles was the changing pressures that would be encountered during the rapid rise to the surface from the ocean depths.

The melon-shaped pontoon has a hollow center that traps air. Heating of the center by the sun's rays causes this air to expand and exert pressure on the outer covering. The fluted design prevents a killing rupture because of the resistance it affords.

The Navy wanted a fabric container that would support 75 tons in one spot. In order to prevent extreme bulkiness and to facilitate handling by one diver, Goodyear's engineers had three 25-ton lifting capacity pontoons constructed so that they could be rigged in tandem, one over the other, and exert the desired lifting force.

The pontoons are constructed of synthetic rubber coated nylon fabric having a high tensile strength providing a watertight and airtight chamber. Cables encased in heavy rubber hose are attached to a fitting at the top of the bulb and spread out around the conical body of the pontoon.

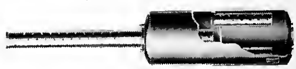
The huge pontoon is shown here undergoing test. For testing purposes the pontoon is suspended upside down and filled with 25 tons of salt water. When in actual operation, it will be attached to the distressed vessel and inflated from surface pumps.

Similar devices were used to keep damaged ships afloat during the Bikini atomic bomb tests last year.

New Terminal Exhaust Snubber Announced by Burgess-Manning Company

Development of a new Terminal Exhaust Snubber has just been announced by Burgess-Manning Company, Libertyville, Ill., for use on all four-stroke cycle Diesel and gas engines with relatively short exhaust systems in stationary and portable service and two-stroke cycle gas engine compressors operating on the Otto cycle in the petroleum field. Designated as Series SDT, these units are available in pipe sizes from 5 inches to 14 inches inclusive.

The new Terminal Exhaust Snubber combines the tail pipe with the exhaust Snubber and is intended for vertical mounting at the end of the exhaust system. No additional tail pipe is required. The new Terminal Exhaust Snubber gives effective noise control by dissipating the slug's energy before it is released to atmosphere.



Terminal Exhaust Snubber

New Ameroid Supply Ports

E. F. Drew & Company, Inc. announce the establishment of two new service and supply points for Ameroid marine products and service for the Ameroid system of boiler water treatment. They are: William H. Muller & Company, Inc., N. V., Rue M. Mahmod Pasha No. 6, Port Said, Egypt; and Comptoir R. G. Muller & Company, 144 Avenue Du Margrave, Antwerp, Belgium.

San Franciscan Wins Highest Westinghouse Honor

Charles P. Johnson

Chas. P. Johnson, western public relations manager for the Westinghouse Electric Corporation, was awarded the Westinghouse Order of Merit on December 1. The Order is the highest award the Company bestows for distinguished service.

Johnson received a bronze plaque bearing his name with the Silver "W" and the inscription "Whom his fellow men delight to honor." Voted by the Board of Directors, the award was presented by Chas. A. Dostal, Vice President in Charge of Sales for the Pacific Coast District.

The award was accompanied by a citation, signed by A. W. Robertson, Chairman of the Westinghouse Board of Directors, and Gwilym A. Price, President, which read "for his superior writing craftsmanship and his ability to interpret Westinghouse to editors of both technical and general publications; for his self reliance in directing the Company's public relations activities in a vast area far removed from headquarters; for his faculty to form lasting friendships among the staffs of newspapers and magazines throughout the West, which have been reflected in friendliness toward Westinghouse; for his cooperation in advancing all phases of the Company's operations on the West Coast."

A native of Denver, he attended the University of Colorado at Boulder, where he majored in chemical engineering, joined Westinghouse in March, 1939, as a writer for the Central Publicity Division at the East Pittsburgh Works, and in that same year he was called to New York to assist in their Eastern Publicity Department. In May of 1939, he transferred to the company's Lamp Division at Bloomfield, N. J., as a publicity representative. He was transferred to San Francisco in September 1940.

Prior to joining Westinghouse, Johnson served as a reporter on the Rocky Mountain News, Denver, and later as Aviation Editor, Literary Editor and Assistant Sunday Editor on the Pittsburgh Press, Pittsburgh, Pa.

He is a member of the San Francisco and Los Angeles Press Clubs, the San Francisco Electric Club and the Pacific Coast Electrical Association.

Controllable Pitch Propellers

(Continued from page 93)

distance as compared to reversing turbines and fixed propellers, and that cruising fuel savings of 10 to 20 per cent can result from using decreased pitch and corresponding higher turbine speeds.

Experience with various pitch-changing mechanisms indicates that both hydraulic and electro-mechanical devices can be made reliable. Emphasis should be placed on simplicity, reduction in friction forces, elimination of backlash, and minimizing hub diameters. Methods are now available for achieving the proper blade designs for controllable-pitch propellers in order to attain maximum overall efficiency and minimum control force requirements for the mechanism.

The appreciable advantages of controllable-pitch propellers in providing increased towing power, flexibility, maneuverability, and fuel economy for tugs, fishing craft, and other vessels which operate at variable loads, as well as for providing flexibility and a convenient reversing means for marine gas turbine power plants, point the way to continued developments and increased applications for future ship propulsion.

(Synopsis of the paper by Capt. Homer Ambrose, Comdr. G. C. Humphreys and Lt. Comdr. F. E. Swiderski, "Propulsion Diesel Engines for Landing Craft and Small Boats," will appear in the January issue.)

Comer Joins Wm. Powell Co.

James Coombe, President of The Wm. Powell Company, Valve Manufacturers of Cincinnati, Ohio, announces the appointment of Joe L. Comer as Vice President in

Joe L. Comer

charge of Sales in the New York Area, with offices at 50 Church St., New York City. Comer was for many years engaged in general sales and trade relations with the Crane Company. In 1943 he joined Culbert Pipe and Fittings as Vice-president.

Book Review

FORMING OF AUSTENITIC CHROMIUM-NICKEL STAINLESS STEELS, assembled and edited by Vsevolod N. Krivobok, The International Nickel Company, Inc., and George Sachs, Case Institute of Technology; published by The International Nickel Company, Inc. Price $4.00.

Compiled to afford fabricators of metal equipment a better understanding of the unusual adaptability of stainless steels to all modern processes of forming, this book presents a detailed description of the modern forming procedures applied to chromium-nickel stainless steels as practiced in the fabrication plants of the United States. The principal stainless steel producers and fabricators cooperated with The International Nickel Company, Inc., to provide this technical and practical volume.

Bending and straight flanging, forming of curved sections and tubing, deep drawing, die forming, forming of contoured-flanged parts, and forming by miscellaneous methods are some of the processes discussed in the book. The specific examples of forming technique are supplemented by details of tool design and tool materials, information on lubricants, data on dimensions, and a listing of consecutive steps in fabrication.

Paint Brush Safe

A sealed, air-tight, all-metal container designed to suspend paint brushes at the correct depth in individual compartments holding paint solvent or preserving fluids, has just been announced by the Y & N Manufacturing Co. of Wooster, Ohio.

This Y & N Brush Safe not only preserves paint brushes and keeps them in tip-top shape, but it also makes a compact, lightweight carrying case which can be locked to avoid tampering and theft. Brush Safe has special waste-compartment with wringer attachment which extracts surplus paint or preserving fluid. Waste compartment is removable for draining and cleaning; and can be placed in any position within the Y & N Brush Safe. Movable brush clips in the individual storage compartments permit storage of brushes of varying dimensions. Each storage compartment is removable.

The all-metal construction and tight-sealing lid of the Y & N Brush Safe reduces fire hazard; it carries the approval of the National Life Saving Service Research Bureau for use in the U. S. Life Saving and Marine Service.

Paint Brush Safe. Inset shows removable waste compartment with wringer attachment which does away with the mess of cleaning paint brushes.

Oil in Gulf

(Continued from page 53)

miles from New Orleans.

An oceanographer, employed by Humble, will provide continuous wave and weather information to the fleet of crew boats, tugs, and barges based at Grand Isle. Using data from the U. S. Weather Bureau, accurate forecasting of wave height and weather conditions will greatly enhance safe and efficient operations. The entire fleet is equipped with Very-High Frequency (VHF) radio equipment, and radar sets are being installed in some vessels for safer navigation.

More Tests Are Planned

The wells to be drilled from this platform will be some of the first to seek oil beneath the continental shelf. These are the forerunners of many more tests now being planned by Humble and other companies. Thus, in pioneering the development of the potential oil reserves bordering the Gulf Coast, the experience gained in constructing and operating from this platform should prove valuable in future operations. Resisting the attacks of the Gulf and the weather is a great task in itself, yet the production of oil in the waters of the Gulf of Mexico depends upon the success of structures such as this Giant in the Gulf.

Fairbanks-Morse Stages Diesel Sales Conference

With "It's Time To Sell Diesels Again" as their theme, over 200 Fairbanks, Morse & Company, men from branch houses, field sales and service divisions spent four days during the week of October 17 in a compact, fast-moving work conference at their Beloit, Wis., works.

The members in attendance at the conference came from all parts of the United States, Mexico and Canada. General chairman of the work conference was O. O. Lewis, Sales Manager, assisted by T. M. Robie, Manager of Diesel Sales, and H. J. Barbour, Manager of Sales Promotion and Public Relations.

The conference began with a management seminar on the subject, "How To Hire and Improve People", conducted by the Personnel Institute, Inc., New York City. An inspection tour of the Beloit Works production facilities was made on the second day. The third day, papers were presented covering the application of the Opposed-Piston and Model 31 en-bloc diesels, and new, improved models of engines were shown. Closing day of the work conferences was devoted to a comprehensive discussion of engineering studies and developments of Dual Fuel use. The subjects of advertising, finance credits and contract procedure were also covered, and sales suggestion talks were presented.

Branch house managers at the Diesel Sales Conference.